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Some Notes on the History of Sport Bibliography

By Dr. I. Szukovathy
Director, Royal Hungarian College of Physical Education, Budapest

DEAR colleagues, our life task and our vocation is the same, and consequently our field of interest must be the same. I feel sure, and am convinced that you share this conviction, that we can only worthily fulfill our task, if we are not just content to know simply enough to pursue our daily round of duties, but also experience a deeper interest in the science of our branch of work, and strive to gain a greater knowledge and insight into this science. Nor is the gaining of knowledge enough in itself, for that must be, in turn, enlarged by research work and experiments. We should not, as teachers of physical education, be attracted only by the practical problems of our work, but we should also attempt to be active workers in our special field, as well as passive workers.

Anyone wishing to penetrate more deeply into the study of our subject, or any other science, will, I believe, undergo the same experience. First, one enters into the bulk of the present state of the subject chosen, but after a time comes the endeavor to look forward at the possibilities held by the future. At the same time one becomes conscious of the need to become acquainted with the past of the question we are studying. This natural impulse of looking back not only prepares a solid basis for the work directed to the future, but often inspires new and original ideas, or throws new light on values. And, while tracing the lines of future development, it provides a direct line to historical criticism. No doubt, to be absorbed in the historical view of any question affords an excellent foundation and an improved facility for building up the necessary store of knowledge, together with an accurate and decided opinion of the subject. But historical research does not simply amount to collecting auxiliary knowledge or information. How often do we experience in the course of historical exploitation, that truths (human), so as to say, return to life, and after being forgotten for what is sometimes a considerable period of time reestablish themselves even with increased force? That is why a study of history leads to a recognition of difference in values, and teaches us to sort out positive truths, distinguishing between positive values and those which are merely the fashion of the day.

And so I should like to draw the attention of every physical educator who wishes to penetrate more deeply into the scientific questions

relating to physical education. Even if the historical aspect does not hold his special interest, my object is not to begrudge the time and trouble of entering into the history of this, which is more than a thousand years of age, but to produce results of lasting value. It is quite certain that in studying the historical past the physical educator will augment his knowledge and add to his outlook by quite unexpected riches. It is really wonderful what history has to say; what a great deal it teaches, even to the modern physical educator, with eyes fixed on the future; and what it tells us, not only of the past, but of the present and future, too. The truth of the old saying *Historia est magistra vitae* (history is the task master of life) applies to us too.

In my address I should like to prove the importance of becoming acquainted with the history of physical education, and I should also like to arouse interest in this subject. By shortly summing up my experiences and researches in the field of sport bibliography, I should like to present a comprehensive view, not only of sport bibliography, but also supply directives in the history of sport for those who wish to enter on this less trodden path of study. It is interesting to note the great increase in sport literature these days. Those versed in this literature will agree with me that the majority of these works, following on one another's heels, are mainly of practical character, bearing reference only to the present, and so are of transitory value. Without doubt, we find in the sport literature of today books merely acting as guides in the practical side of our subject. They appear in the market in many copies, but have no reference even to the near future. We must turn back all the more willingly to works of positive value. The field of comprehensive physical education literature is a very wide and diversified one. So in speaking of it, I must carefully keep myself in check. I have set myself the task of introducing in the first place the better known works treating of the history of the various sports. First in order comes the literature of the sports of the Classic Age, and then the data of sport bibliography of the leading branches of sports (human), which are included in the program of the modern Olympic Games, such as fencing, swimming, gymnastics, boxing, wrestling, athletics, sport-like competitive games, and modern athletics. I wish only to enumerate the works of first importance in research and for studying the history of sports. It would require a special paper to make known the works illustrating the history of physical education from the pedagogic viewpoint. There are very many such works and in many histories of the science of education, we see a prominent place given to physical education as a part of education in general. The modern physical educator must be well versed in the history of pedagogics.

I do not intend to include the bibliography of hunting, shooting, and fishing. This field is, on the average, well-known and cultivated and explored, and it has not too great interest for us physical educators.

Before going into the details of our appointed theme, I must mention a few facts relating to the method of research. The world's great libraries, as that of the British Museum, the Bibliothèque National in Paris, and other national or university libraries do not register physical education, physical exercises, or any other branch of sports, as titles or even as sub-titles, so we must search the list under headings bearing reference to our subject when compiling sport bibliographical data. Under the heading "Sport" we generally find works relating to shooting, fishing, or simply pastimes. Sport libraries or large collections of works on physical education are rare. During my study trips I have found that one can generally find a special library at physical education schools or colleges, which, although satisfying the requirements of the students, does not deserve the name of a public or private collection. One of the largest was that of the Physical Education College of Spandau, Germany (Prussia), which is no longer active, and the library has since become the property of other physical education authorities in Berlin. The library might be estimated to contain a perfect collection of physical education works published in Germany, its only deficiency being that it contained very few foreign works. The library of the Deutsche Turnerschaft (German Gymnastic Association) presents much the same case. Without doubt this collection of approximately ten thousand works on physical education is the largest of its kind in the world. The largest catalogue was published in 1925.

Much care and understanding were evident in the choice of the volumes, including many foreign publications, of the Deutsche Hochschule fur Liebesübungen of Berlin, Charlottenburg, which will evidently become the heritage of the Deutsche Reichsacademie opening this year. There is a printed catalogue of this library, too. Anybody wishing to study the development of physical education in Germany will find all the necessary works of reference in these libraries, but you will not gain even a general idea of international literature. I know the libraries of all the more important physical education colleges in Europe, and so I dare to say that none of them supply adequate material. In America, Springfield College possesses the largest library, but even this is deficient in works relating to the history of sports in Europe.

Great wants can also be experienced in other auxiliary means of sport bibliography research. There is no general guide book. C. M. van Stockum's *Sport Bibliography*[1] only accounts for the literature of the period from 1890 to 1912. *Bibliographie des gesamten Sports*[2] by S. Weissbein and E. Roth, published at the time of the Hygiene Exposition in Dresden in 1911, does not contain a full list of works either. Still, this is the most complete and only work at our disposal, which, even if it does not exhaust the subject, does treat in general on the sport literature of olden times. Later on I shall have the pleasure of

[1] Indices refer to the Bibliography at the end of the article.

pointing out that the position relative to the literature of certain sports is more favorable.

There are also comparatively few works on the general history of sports, and very few of the handbooks and manuals, or special books in this line, are good ones. Of the books published in Europe, Dr. Hans Brendicke's *Grundriss zur Geschichte der Leibesübungen,*[3] published in 1882, contains, beyond doubt, the greatest number and the most interesting items. This short work, covering only 172 pages, provides us with excellent and reliable data. The bibliographer's greatest objection to this book will be the difficulty in procuring it. The book dealing with the history of physical education, now most generally used in Central Europe, is the Angerstein-Kurth, *Geschichte der Liebesübungen*[4] which, however, contains only data of general interest, is very suitable for use as a manual, but is no help towards scientific research. It also has the shortcoming of representing all questions from the viewpoint of German gymnastics, and so does not give a reliable and critical survey. Those interested in the historical aspect of German gymnastics will find items in other works as well, such as Dr. Gasch's *Geschichte der Turnkunst,*[5] then Dr. H. Brendicke's two books, *Bilder aus der Geschichte der Leibesübungen*[6] and *Geschichte der Leibesübungen.*[7] Neuendorf's lately completed book in four volumes, entitled *Geschichte der neueren deutschen Leibesübungen*[57] is a valuable and comprehensive work, which no one interested in research work can dispense with. It gives a full and detailed account of the historical development of physical education in Germany. I must also draw your attention to G. A. E. Bogeng's *Der Sport aller Völker und Zeiten*[8] in two large volumes, published since the war, in pleasing form and with well executed explanatory reproductions. This book is one of the best general sport historical books we have. The various chapters have been written by different authors and the book contains data of interest and is well illustrated. Its fault from the viewpoint of bibliographical and historical research, is that the historical data are not accompanied by references to historical and bibliographical sources.

In Hungary, during post-war times, Dr. Laszlo Siklossy, commissioned by the Board of Physical Education, wrote his book, *The Thousand Years of Hungarian Sports,*[58] which appeared in three large volumes in the years 1927–29. No other country can surpass such an exhaustive work of this kind. The book is, naturally, written in the Magyar (Hungarian) language (known, alas, to so few) and thus has not become common property except by virtue of its illustrations.

Two American histories of physical education, *A Brief History of Physical Education* by Emmett A. Rice[9] and *History of Physical Education* by Leonard and McKenzie[10] are both well known to me. I often take them in hand, especially the latter, and dip into them with great interest. Both books give bibliographical references.

Besides these pronounced sport historical works, many books on kindred subjects give us the history of single epochs. Thus, many pedagogists have written on the humanistic and philanthropist period, from the viewpoint of the history of physical education. It is true that items of general sport and sport historical interest are to be found very often in popular form, and in sport encyclopedias of former and more modern times. Among these I should like to mention, as better known, *Encyclopedie Methodique,* 1786;[11] *British Rural Sports,* Stonehenge;[12] *Encyclopedia of Rural Sports,* Delabere P. Blaine;[13] *Every Boy's Book*;[14] *Encyclopedie,* D. Joh. Georg Krünitz;[59] *The Encyclopedia of Sports,* H. Peek and F. G. Aflalo.[15] This last book is the largest of its kind at the present time. Of the more modern ones the French *Encyclopedie des Sports,*[60] published in 1924 in two volumes, deserves to be recommended. In the latest work of this type to appear, Beckmann's *Sport Lexikon,*[16] published in 1933, we find many useful sport historical facts supplied by Prof. Dr. Erwin Mehl. Reviewing the more popular sport historical works, research will find useful information in Spemann's *Goldenes Buch des Sports,*[61] and in J. D. Georgens' *Illustriertes Sport Buch.*[18] Those interested in the history of English sports will find J. Strutt's book, *The Sports and Pastimes,*[19] which appeared in the last century in a large number of copies, both interesting and instructive.

After thus shortly enumerating the bibliographical data of works on the general history of sports, I will now proceed with the bibliography of the single epochs, as I proposed doing at the introduction of my address. Permit me first to introduce the works referring to classic Ancient Greece. It is certain that the literature of this time has been greatly enriched by the results of the latest archaeologic researches. It is characteristic of the bibliography during this time, that there are comparatively few works on the practice of olden times, but these few are first-class ones. This field has been explored by a few men so well prepared for their task, and on the grounds of scientific research, that newer study can only add details at the most. In the first place, I can recommend *Die Gymnastik und Agonistik der Hellenen,*[20] Volumes I and II, by J. H. Krause, and Gardiner's *Greek Athletic Sports and Festivals.*[21] These display a very profound study of the subject. The bibliographer will again have reason to complain of the difficulty in procuring a copy of Krause's book, and the same applies to that of Gardiner's. Just recently a new edition was issued.

Excellent works also worthy of notice are *Olympia das Fest und seine Stätte,*[22] by A. Boetticher, the first part of *Erziehung und Unterricht*[23] by Dr. Lorenz Grasberger. The subject of this latter is the physical education of the ancient Greeks and Romans ("Die leibliche Erziehung bei den Griechen und Romen"). John Potter's work in the English language published in the beginning of the last century, *An-*

tiquities of Greece,[24] contains many data which are interesting from the historical aspect of the question. Two other good books are Krause's *Theagenes*,[25] and *Olympia*.[26] Then there are Dr. Fr. Fedde's *Fünfkampf der Hellenen*[27] (also of the last century), Dr. O. H. Jaeger's *Gymnastic der Hellenen*,[28] Dr. Edward Pinder's *Fünfkampf der Hellenen*,[32] J. Jüthner's *Antike Turngerathe*,[30] A. J. Butler's *Sport in Classic Times*,[62] and finally Bruno Schroeder's *Der Sport in Altertum*.[63] Of the works of the present century, J. Jüthner's *Korperkultur in Altertum*[29] and Theofil Klee's book *Zur Geschichte der Gymnischen Agone an Grichischen Festen*[31] are especially worthy of note. Naturally I have not exhausted the whole list, by the works which I have enumerated. In this field we find many connections with other subjects, and in the first place with books on the history of art. Books on the art of Ancient Greece bear many references to the art of sporting at the time, which are also available for sport historical research. Permit me to close this part of our investigation by mentioning a few manual-like works such as W. Richter's *A Görögök és Rómaiak Játékai* (The Games of the Greeks and Romans),[33] of older origin, and the more recent one by Ferenc Mezö, *Az Olympiai Játékok Története* (History of the Olympic Games),[34] which carried off one of the first intellectual Olympic prizes.

From the historical and bibliographical point of view, fencing comes nearer to the sports of the Classic Age. This branch of sport boasts the oldest bibliographical past. The fine arts, as painting and sculpturing, preserve historical relics of other sports, as of wrestling, in Egypt and China, and of pony-polo in Asia. There are also very old records of shooting and fishing which I have not included in my address, but considering printed matter and manuscripts preceding them, we find the oldest records regarding fencing. I must here mention Tahlhoffer's manuscripts of 1443, 1459, and 1467, and also Albert Dürer's of 1512. This last contains a few illustrations of wrestling, otherwise all four only mention fencing. Fencing not only has the oldest literary records remaining with us, but it also has the most exhaustive bibliographical data compiled regarding it. In contrast, fencing has, of all the sports, the least amount of literature in present times, which, however deplorable, can be explained by the decreasing interest shown for this sport, and by the fact that the works of the last century seem to have explored every detail in this field. Collectors often specialize in works on fencing. I know of collections which boast over thousands of books on fencing. For instance, that of Mr. Corble (England), is one of the largest special private collections in the world. We find the largest possibilities and resources in this field, both in historical and bibliographical research. The French *La Bibliographie de l'escrime* by Vigeant,[35] and the Italian *Bibliographia Generale della Scherma* by Jacopo Gelli[36] are very good ones of their kind, but no one can dispute that the first

place is due, by virtue of its scientific value, to C. A. Thimm's *Bibliography of Fencing and Dueling.*[37] Thimm's book is not only a pre-eminent bibliography, but also supplies other excellent data on the study of the history of sports in general. The author has spared no pains, besides adding his full knowledge of the subject, when compiling the material for his book, which deserves our admiration, and we can safely say that this work is indispensable to all working in this field. We can become acquainted with the history of fencing through E. Merignac's *Histoire de l'Escrime,* Volumes I and II.[38] E. Castle's book *Schools and Masters of Fencing,*[30] published in French and in English, also provides useful historical matter. In olden times fencing was a means of self-defense and played a great part on the battlefield, but still for centuries its closest connection was with dueling. There are special works treating the history of dueling.

Next follows, according to our scheme, the bibliography of swimming. This also boasts an excellent and reliable work of historic as well as bibliographic importance written by Thomas Ralph and bearing the title *Swimming.*[40] It is indispensable for research work in this field. This work not only supplies detailed bibliographical matter from the very beginning up to the present century, but also adds very interesting historical comments. The work can be well compared to that of Thimm. Even if the author, as my own researches go to prove, has not compiled the bibliographical data with as much precision as Thimm, he does not content himself with giving the dry bibliographical items of the works mentioned, but adds to these other and most useful remarks and data. Items of bibliography relating to swimming are to be found in books of older date, as Friedrich Kries' *Der Schwimmkunst,*[41] translation of the Italian original of Bernardi, published in 1797; in R. Harrington's work *Swimming;*[42] in a book by an unknown author entitled *Vollstandige Schwimmschule*[43] published in 1827; also in *Swimming* by Sinclair and W. Henry[44] appearing in the Badminton Library series. Sport books published in this series contain in the introductory part, so to say without exception, a chapter on the historical development of the sport in question. Although they are more or less of a popular character, still they contain many interesting facts. It is a pity that the literary references of the historical parts are missing. Prof. Mehl, the chief authority on the oldest historical questions of swimming, provides very useful data of this time in his book *Antike Schwimmkunst.*[64]

To keep at our program, I must now pass on to the bibliography of gymnastics. We consider A. Tuccaro's *Dialogue de Sauter,*[45] published in 1599, as the oldest printed material in this line. In the seventeenth and eighteenth centuries following, we find descriptions of gymnastics and movements in connection with accounts of those known as "volting." Pascha's work published in 1659[65] and that of Schmidt of 1712[66]

are good examples of the type. Up to the end of the eighteenth century we know of very few works in this line until the time that books on the new gymnastic systems began to be published. Even in the *Encyclopedia* of Krünitz, published in 1796,[59] and of Vieth, published in 1794–95, there are but few and scattered references to gymnastics. In the first half of the nineteenth century, simultaneously with the rapid development of the German and Swedish systems, a good many books were published on this subject. Regarding special literature this period has been most fruitful. The catalogues that I enumerated at the commencement of my address provide all information on the bibliography of German gymnastics. I can also warmly recommend the first and second editions of G. Hirth's *Das Gesamte Turnwesen*[46] as giving a summary account of the older German systems. The first edition appeared in one volume, the second in four volumes, and they contain interesting facts on the history of gymnastics. We can find in Dr. Carl Euler's book *Handbuch des Gesamten Turnwesens,*[47] in three volumes, encyclopedia style, all the historically interesting facts of German gymnastics. A short and lucid account of the history of gymnastics is presented in Dr. E. Mehl's *Grundriss des Deutschen Turnens,*[48] and the sport bibliography of modern times can be found in the volumes of *Jahrbuch der Leibesübungen*[49] of 1924–32, published by the German Reichsausschuss, and exhaustive data can be found especially in the volume for 1930 compiled by Dr. Karl Diem.

Wrestling as a sport has no summary bibliography. The first book on wrestling was probably published about 1500. This volume is at the same time the first printed book on sports. An addition was made to it in the sixteenth century, and the improved work, covering 25 pages and illustrated by interesting woodcuts, was re-edited and annotated by Wassermannsdorf in 1871.[67] Beyond these, and Petter's beautifully illustrated book on the art of wrestling published in Dutch and German in 1674,[68] we can find scarcely any works of earlier times relating to wrestling. Data, similar to those relating to gymnastics, are to be found in works of the sixteenth and seventeenth centuries on fencing, in Dürer's manuscript and Schmidt's book published in 1713, which we have already heard about. Modern literature on wrestling is also meager.

I know of no detailed and independent bibliographical work on boxing. Boxing in the time of the Greeks and Romans is mentioned in works on the physical exercises of the period. Here we must not forget to mention Hieronymus Mercurialis' *De Arte Gymnastica libri sex,*[69] published in more than one issue and more than one language in the sixteenth century and containing numerous items referring to this sport also. The history of boxing in England, which can be considered the first historical account of this sport, starting on its newer path from this country, is made familiar to us by H. Downs Miles' book *Pugil-*

istika, the History of British Boxing[50] in three large volumes. A good, although shorter collection of bibliographical data is presented to us in *Fistiana, or the Oracle of the Ring* by Prize Battles,[51] and in *Boxing in Art and Literature* by W. D. Cox,[70] published recently in New York.

Next permit me to mention a few facts relating to field competitive sports. Here, too, we are in need of a bibliographical summing-up work. But we have very good works on the history of single sports. The oldest information dates from the time before printing and remains with us in the form of tennis pictures—for example, its forerunner. There are no older books on the game itself and its history is known mainly through illustrations and short descriptions. There are three excellent works on the development of tennis in our times, the most artistic being *History of Tennis* by E. B. Noel and J. O. M. Clark[52] in two large volumes, describing, in the first place, the history of tennis in England, but also referring to its history in other countries. As far as historical data is concerned, *La Magnifique Histoire du Jeu de Paume* by Albert de Luze[53] is the best, summing up the history of tennis to the most recent times and not forgetting international relations either. The third is Henry René d'Allemagne's *Sports et Jeux d'Adresse*[54] published in Paris in artistic form and beautifully illustrated. Besides giving an historical account of the development of games in general, it also provides a most valuable historic review of tennis and kindred games of ball.

An animated discussion has been going on for some time as to the origin of football. If we accept "calcio" as its predecessor, the old books on this must be looked upon as the oldest bibliographical relics on the subject, and Alfredo Lenzi's book, *Il Gioco del Calcio Fiorentino*[55] published last year, affords an interesting historical summary of the same. In this work we find a detailed sport bibliography on calcio, beginning with the sixteenth century. We find an exhaustive history of modern football with reference to the conditions in England in A. Gibson and William Pickford's, *Association Football*[56] in four volumes.

In this connection, I should like to include in my address a few words on two popular competitive sports, athletics and skiing. Neither of these sports have a special bibliography. Searching for historic data, we must admit that we meet everywhere a most ancient relic of skiing with a reproduction of a wood-cut, which first appeared in *Commentari della Moscovia* by Sigismund Herberstein,[71] published in 1550. In the following centuries scarcely any works appeared on skiing as a sport. This is due to the fact that skiing was looked upon in the Northern States, its original home, as a means of conveyance, and has only been regarded as a sport, both here and in the Central States of Europe, in Switzerland and Austria, in the last few decades. A work by Baldvinus entitled *De Calceo etc.*,[72] published in 1667, is but little known. In this we do not only find a description of skiing, but also illustrated explana-

tions. A more modern book on the history of this sport is A. Lunn's *A History of Skiing* which refers almost exclusively to the history of newer times, but the data referring to former days are very imperfect.[73]

Many branches of modern sports, or, as they would be called in America, "Track and Field," spring from the time of the ancient Greeks. Accounts of these are best derived from works giving a scientific description of the period. Otherwise, modern athletics started in England at the beginning of the last century. Up to that time we only find in literature works on the athletics of the ancient Greeks, and of these *De Arte Gymnastica libri sex* by Hieronymus Mercurialis[69] and *Agonisticon* by Petri Fabri,[74] published in 1592, are the best known.

The first publications of newer literature are the articles on "pedestrianism" and accounts of the achievements in this line, appearing at the beginning of the nineteenth century. At least such is the opinion of experts considering this physical exercise, or to be more correct, movement, as the first step to modern athletics. Prof. Dr. Otto Misángyi, without doubt, one of the leading authorities on athletics of our day, considers *Athletic Exercises* by John Sinclair,[75] published in 1806, as the first scientific book on modern athletics. In the first half of the nineteenth century comparatively few works appear treating exclusively with, and employing the expression of "athletics," but in other physical education works of the time, especially those on gymnastics, we find many descriptions of exercises which are the same as those now known as athletic exercises, although the word is not used. The history of modern athletics has been presented by Dr. Misángyi in his book *Az Ujkori Athletika Története*[76] (History of Modern Times' Athletics), published a few years ago. An English translation is to appear shortly. This book provides us with accurate and reliable data of the history of modern athletics together with the more important bibliographical ones.

In conclusion, I wish again to call the attention of my listeners, all deeply interested in the scientific aspect and theories of physical education by virtue of their calling, to the fact that in striving for thorough knowledge of our common subject we have need to be acquainted with, and to love the past, as I stressed in my opening words. Even as the botanist is not content with studying only the over-earth parts of a fine tree, the crown, the trunk, and the blossoms, wondering to what perfection it can attain or be brought to, he will rather concentrate on the life-giving and life-preserving roots. Even so, we cannot be content with a thorough knowledge of the present state of physical education and the promises of the future, but we must perfect both and gain new impulse by going back into the past, and by studying the life-giving and life-preserving roots hidden in history. If, by my address, I have attained no other end than that of awakening your interest in the past,

and by this, inspired a desire to become acquainted with the ends and purposes of by-gone days, that is, if I have raised in my audience an interest in research, I am richly rewarded.

We see intensive and many-sided research work being carried on in our day in the various fields of sports. Sport bibliography has been added to also, and some very serious and valuable books have been published on the subject. Interest in the history of sports has become more lively lately, and in consequence we have enjoyed reading some of the profound articles in this line. Still, I wish to emphasize that there are great tasks awaiting the younger generation, interested in the serious scientific aspects of their vocation. Many problems of sport history still await an answer. And may I assure all undertaking research work that besides accomplishing useful tasks, and promoting the general aim, they will also experience much pleasure and happiness in their work. They will learn to know their books as true and faithful friends, inciting them to further efforts and supporting them by sound advice. My readers, I trust I see in you ardent searchers of the past and staunch builders of the future! You all have my sincerest good wishes for your success!

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Undergraduate Attitudes and Interests with Regard to Physical Education Activities at Wellesley College

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THE value of obtaining the reaction of the student to the forms and processes of education to which he is exposed has been recognized in recent years in institutions of higher learning, and in many of them, especially of the so-called progressive type, surveys of student opinion are made from time to time or continuously, to serve as guides in the attempted solution of the problems of program development. A similar need has been called to the attention of those concerned with curricular progress in the field of physical education—notably by Wayman in 1930[1] and McCloy in 1930 and 1931.[2]

A study by Saxman had already appeared in 1926 on the leisure-time uses of activities learned in state teachers colleges. The first ten preferred activities were swimming, tennis, dancing, hiking, riding, camping, basketball, golf, baseball, and skating.[3]

Driftmier in 1933, using a check list similar to McCloy's, found that high school girls preferred rhythmic activities, and next to them, basketball and tennis. Self-direction and freedom of choice were spoken for.[4]

Alden (1932) reported on the factors in the required physical education program that are least attractive to the college girl.[5] Bullock and Alden, in 1933, showed in a study of student attitudes at the University of Oregon that whatever dislike there was for physical education activities in the university was 71 per cent due to late afternoon classes, about 10 per cent to lack of ability, and about 10 per cent to the sense of compulsion.[6] The authors recommend that unfavorable attitudes be eradicated "by improved methods and organization."

Lapp (1933) in a study of pupil objectives (boys and girls) in the high schools of four mid-western cities and towns questioned 1400 students.[7] Check lists of individual objectives were used by the method of "indirect approach." Students in the various schools show a remark-

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[1] Numbers refer to Bibliography at the end of the article.

able consistency in classifying objectives into high and low value groups. Those who like physical activities choose a worthy list of personal objectives more preponderantly than those who do not. The terminology of character education is meaningless to students of high school age. Boys enjoy physical education activities more than do girls and are more interested in heart, lung, and muscular development. Girls are more interested in posture and grace.

Marshall in 1934 in a survey of the requirement situation in many colleges and universities, reports that the opinion of women students in nine large universities in the mid-western, southern, and far western parts of the country averaged 74 per cent in favor of a physical education requirement.[8] In the University of California in 1933, 53 per cent of the women students favored a requirement, 41 per cent opposed, 65 per cent would elect physical education if it were not required, and only 16 per cent would not elect it. These summaries were based on 1550 replies. In Grinnell, in 1932, she reports that 93 per cent (80 of 85 replies) favored a requirement. In the University of Arizona in 1932, in 275 replies a highly favorable attitude toward physical education was indicated though the question of the requirement was not involved. Marshall also reports a study by Kitzinger in 1932 of 27 mid-western colleges and universities in which 79 percent of 8025 replies favored a requirement.

Anderson, in 1934, in a questionnaire study of 800 high school girls in Des Moines, found that 67 per cent had a "feeling" for competition, and 8 per cent had not.[9] Those with the most competitive feeling are most persevering and most appreciative of a progressive program. Ninety-one per cent had boy friends who liked girls to have athletic ability. The order of precedence of activities "liked very much" was tennis, swimming, basketball, skating, hiking, baseball, riding, volleyball, canoeing, and tobogganing.

Studies of attitudes of boys and men (Bowdlear, 1928; Smith, 1933) show in the former a predilection for the concrete objectives of muscular development, leisure time values, and "fun" rather than the more intangible aims set down by their elders in syllabus and text; and in the latter a 95 per cent approval of their physical education courses and a 62 per cent vote in favor of required physical education.[10]

Davis, in 1933, studied the likes and dislikes of two consecutive freshman classes of Pennsylvania State College with reference to the activities offered at that institution.[11] Both classes favored the same ten activities as first choices, with slightly different rankings. Ninety-one per cent of the 1931 freshmen preferred a sports program; 0.03 per cent a formal program; the rest a mixture.

PURPOSE

The purpose of this study is to answer the following questions as far as they can be answered from the questionnaire data obtained from the students of a single institution.

1. What are the favorite physical education activities of the college woman?
2. What are the reasons for her preferences?
3. Are there definite trends in the type of activity preferred throughout the four years of college?
4. What activities does the college woman consider as beneficial?
5. What are the benefits believed to be experienced?
6. What are her reactions to the program as a whole and to the specific activities offered by Wellesley College?
7. What is her attitude toward physical education as a college requirement?
8. What are her reactions to the gymnastic program as a whole and to the sports and non-gymnastic indoor activities as a whole?
9. What is her attitude toward voluntary activities (those in which a student participates of her own desire, and for which she receives no credit toward fulfilling her physical education requirement)?
10. What is her attitude toward informal activities offered without departmental instruction?
11. What are her recreational preferences and how does exercise rank among them?
12. How does she feel toward a motor test given to classify her at the beginning of her first year, and later to measure her general motor improvement?
13. What are the reasons which prompt her to make her choice of electives?
14. How strong is her desire to enhance her physical strength and endurance?

No claim is made that this study constitutes research in the sense that it is a precisely controlled investigation as defined and characterized by Flexner. But it is hoped that in spite of its limited and local character, it may be found to have some application in the general problem of curricular progress.

The usual question will arise in the mind of the reader as to the validity of questionnaire responses in view of the multitude of uncontrollable factors which influence student opinion and stand in the way of any exhaustive analysis and interpretation. It may very properly be said that the background of the opinion must be known and evaluated before the opinion itself can be analyzed. This background comprises, in part: previous training, physical defects, activities being experienced, observational acquaintance with activities, etc. A picture of

student attitude and interest, however fragmentary and evanescent, should at least throw some light on the problem of activity evaluation.

PROCEDURE, RELIABILITY, AND SCOPE

The questionnaire was submitted in March, 1933, to those of the student body resident in the Wellesley College dormitories.*

College Class	Questionnaire	No. answering Questionnaire	Per Cent Answering
Freshman	393	285	72.5
Sophomore	361	237	65.7
Junior	301	165	54.8
Senior	304	136	44.7
Whole group	1359	823	60.6

In its preliminary form the questionnaire had been submitted to the faculty of the Department of Hygiene and Physical Education for suggestions and criticism. It was then tested on a small group of students for inaccuracies, leading and equivocal questions, and obscure statements.

Two weeks after the questionnaire was returned, it was repeated verbally and in a somewhat different form and order to a group of sixteen students selected at random, except that they represented all four classes and a wide scattering of dormitories. The verbal and written answers agreed closely.

It may seem that several important points have been omitted from this report on which it would have been well to obtain information—in particular with regard to sub-collegiate background. Several items which stand on the questionnaire but do not appear here may be reported later. These are:

1. Activities checked as "would like to take" or "Think I ought to take" which have been taken elsewhere. Where taken?

2. Year, periods, length of periods in (1) required, (2) voluntary activities in preparatory school and in previous college experience.

3. Did you feel at a marked disadvantage on entering freshman activities because of poor preparation?—for any other reason?

4. Evaluation of activities in terms of a check list of objectives.

Then there is the problem of questionnaire resistance and questionnaire indigestion. With no known principles to guide them the authors had to rely on intuition in deciding that as much had been included as the student could tolerate in one dose.

* The questionnaire is not presented in this article. Its tenor can be gathered readily from the statement of "Purpose" on page 17, and from the headings under "Questionnaire Analysis," pp. 19–31.

QUESTIONNAIRE ANALYSIS

1. *Activity Preferences* (check lists of 17 indoor, and 16 sport activities)

Activity preferences were ranked by several methods:

a) On the basis of first, second, and third choices, respectively.

b) On the basis of total votes.

c) On the basis of weighted percentages. Votes for each activity were weighted by the factors 3, 2 and 1 according as they were first, second, or third choices, and the ratio of weighted activity votes to total of weighted votes determined.

Only methods *b* and *c* are referred to in this paper. Substantially the same rankings were obtained by method *a*.

TABLE I

FIRST TEN INDOOR ACTIVITIES: RANKING BASED ON WEIGHTED CHOICES

Would Like to Take	Per Cent	Think I Ought to Take	Per Cent
Modern Dance*	16.5	Modern Dance	22.5
Tap Dancing	14.6	Social Dancing	14.1
Social Dancing	13.0	Fencing	9.7
Fencing	12.4	Gymnastic Exercises	9.5
Indoor Riding	8.9	Tap Dancing	7.8
Ping Pong	7.8	Apparatus	7.1
Bowling	7.1	Indoor Riding	5.6
Squash	4.5	Group Gymnastics†	5.5
Badminton	4.0	Marching	2.9
Apparatus	3.1	Individual Gymnastics	2.7

* At the time of this study "Interpretative Dancing" was used for want of a better title, though the character of the activity was in fact what is now implied by "Modern Dance."

† "Group Gymnastics" means the gymnasium work as a whole; the three sub-divisions being "Exercises," "Apparatus," and "Marching."

TABLE II

FIRST TEN SPORT ACTIVITIES: RANKING BASED ON WEIGHTED CHOICES

Would Like to Take	Per Cent	Think I Ought to Take	Per Cent
Swimming	28.7	Swimming	27.0
Tennis	18.7	Tennis	19.0
Riding	16.8	Golf	16.3
Golf	11.2	Riding	10.3
Canoeing	5.1	Basketball	5.2
Crew	5.1	Canoeing	4.8
Basketball	4.2	Hockey	4.3
Hockey	3.6	Crew	4.3
Archery	1.9	Camp Craft	2.0
Hiking	1.5	Hiking	1.9

TABLE III

FIRST TEN INDOOR ACTIVITIES: RANKING BASED ON TOTAL VOTES

Would Like to Take		Think I Ought to Take	
Fencing	404	Modern Dance	273
Tap Dancing	392	Gymnastic Exercises	183
Modern Dance	344	Apparatus	128
Social Dancing	297	Fencing	120
Ping Pong	290	Social Dancing	114
Bowling	275	Tap Dancing	110
Indoor Riding	198	Group Gymnastics	103
Badminton	193	Marching	95
Apparatus	157	Indoor Riding	67
Squash	154	Ping Pong	55

TABLE IV

FIRST TEN SPORT ACTIVITIES: RANKING BASED ON TOTAL VOTES

Would Like to Take		Think I Ought to Take	
Swimming	661	Swimming	392
Tennis	595	Golf	361
Riding	586	Tennis	355
Golf	518	Riding	212
Canoeing	505	Canoeing	157
Basketball	394	Basketball	157
Crew	347	Crew	130
Hockey	248	Hiking	127
Archery	244	Camp Craft	106
Hiking	238	Archery	102

In the above tabulations "indoor" and "sport" activities are so designated for convenience. The two contrasting lists represent (1) non-sport activities with a few minor indoor sports, and (2) major and minor outdoor sports.

Table I shows that, as in Driftmier's study, rhythmic activities are the preference leaders both in the "like" and "ought" lists, except that Tap Dancing loses half its support and drops to fifth place under the "ought" heading.* The preference for modern dance increases by 36 per cent. Fencing takes an unexpectedly high rank. Perhaps the admirable international showing of the American amateur women fencers, and the refinement and high sportsmanship characterizing the activity have something to do with its growing popularity in women's colleges. The positions of ping-pong, bowling, squash, and badminton may be explained by their social values, real or imagined. In the "ought" list it is interesting to see various gymnastic activities creep up into position "to show" among the first ten.

* In the following discussion "like" and "ought" stand for "Would Like to Take" and "Think I Ought to Take."

Figures I and II show graphically for each of the first ten preferred indoor activities the ranking accorded by each of the four college classes on the basis of weighted choices. The reader is left to his own devices in discovering trends of opinion through the four college years. On the whole there is more consistency in ranked preferences, year by year, than was shown by the two freshman classes at The Pennsylvania State College, reported by Davis.[11]

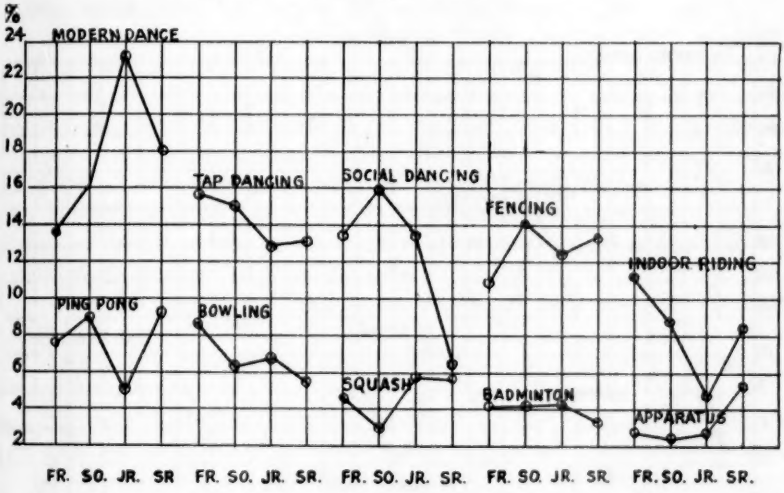

FIGURE I: First ten indoor activity preferences by college classes. "Would Like to Take." Rankings by percentage weighted choice.

It must be remembered that the data derived from four simultaneous cross sections through the four college classes do not necessarily correspond with what would have been gotten from a given class questioned at successive year intervals. Nor should the statistical reliability of differences of opinion from year to year be too implicitly depended upon. In no case does a difference between classes exceed 6 per cent.

In both the "like" and "ought" lists of the first ten outdoor sports (Table II), seven are individual activities. If it is true, as Driftmier states, that high school girls of superior intelligence favor less social games, it is not surprising to find the selected college group leaning heavily toward individual activities.

Nowadays when a team sport is found to be holding its own in competition with individual activities one is tempted to look for exceptional explanations. It is true, undoubtedly, that in Wellesley, crew owes its prestige in some part to its unique local tradition and to the glamor of the college's most popular spring spectacle in which the class eights occupy the spot light. On the other hand, there is certainly no reason to suggest that crew, hockey, basketball, or other team

sports do not possess values of real importance. This is, indeed, the position long held by physical educators; and the fact that there are still large groups which find satisfaction in such activities is a cause for congratulation rather than a reflection on the intelligence of the students who compose such groups.

Nor is it surprising to find that rankings do not change materially in passing from the "like" to the "ought" list. In contrast to indoor

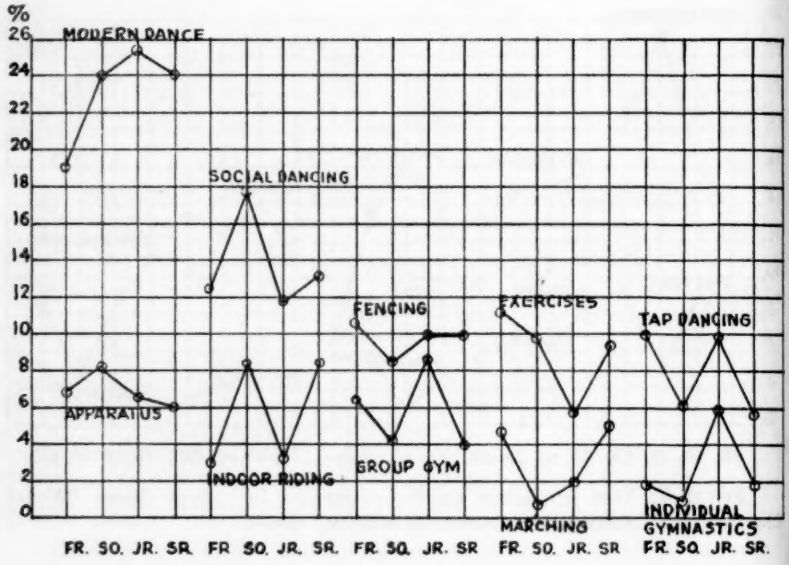

FIGURE II: First ten indoor activity preferences by college classes. "Think I Ought to Take." Rankings by percentage weighted choice.

activities, there are few distinctions having to do with cultural, hygienic, orthopedic, and corrective values. The only concession to the faculty's insistence on the character value of team sports is the promotion of basketball and hockey a step or two, with a gain of about 25 per cent for these activities.

When ranking is based on total votes instead of weighted choices, it is noteworthy that fencing leads in the "like" column with a heavy plurality (Table III). Tap dancing is a good second. Perhaps the brilliant success of such American fencers as Dorothy Locke, and the stage and screen vogue of such remarkable performers as Ginger Rogers, Eleanor Powell, Fred Astaire, and Bill Robinson may explain the rush of these activities to the top of the list. Incidentally, there may be a lesson here in motivating participation by providing a reasonable amount of opportunity for gallery observation of superior performance and exciting competition.

In the outdoor sports the ranking on the basis of total votes coincides for the most part with the ranking based on weighted choices.

2. *Leading Reasons for Choice.*—Reasons for choice were classified for each of the first ten indoor and sport activities. They were ranked according to the number of mentions and also evaluated in terms of the percentage of students mentioning the reason, out of the total number of students who checked the activity. The original tabulations repay close examination, but only a summary can be given here.

Among the reasons for checking activities in the "like" columns, *enjoyment* naturally leads in a majority of activities (8 out of 10). It is a matter of interest, however, that enjoyment is not given even once as a reason for wanting to take modern dance. Is it a reasonable theory that students see and find in the dance a form of satisfaction—physical, intellectual, and aesthetic—that is deeper than merely "having fun"? It may be that the type of student who chooses to participate in this activity or who is attracted to it without participation is interested more in analyzing the reasons on which the attraction and the choice rests, than in cultivating the emotional experience for its own sake.

In general, the desire to *gain skill* ranks next. This high ranking is explained on the obvious principle that we enjoy what we do well. Aptitude tests should, therefore, be guides to the most likely channels to a satisfactory skill and therefore to the greatest possible enjoyment.

Desire to learn is a prominent reason for choice, bearing witness to the general interest in new and untried things. The gaining of skill and the inclination to learn new things obviously are the horns of a dilemma in a teaching program.

Social value also ranks high. ("They laughed when I told them I could play tennis.") It is more than likely that in the student's mind the term connotes the practical aids to social success rather than the cultivation of abstract textbook qualities of character and personality. Nevertheless, it is worthy of serious consideration.

Most of the other reasons mentioned frequently enough to deserve classification are concerned with leisure-time values and with the enhancement of physical well-being. The latter cannot be expected to rank very high at an age level where physical infirmities are at their minimum.

Among the "ought" preferences, the reasons, over and above those just mentioned, fall mostly under the following: "Increased coordination and motor control," "grace and poise," "posture and carriage," and "training in rhythms."

The conclusions and corollaries to be derived from this part of the study may well be framed in the form of questions, the answers to which constitute a criterion which determines as a whole or in part the value of an activity in the physical education program from the student point of view.

1. Is the activity such that it can be intelligently enjoyed and appreciated by the group in question?

2. Will participation lead to increased skill and therefore to enhanced satisfaction?

3. Will it be of value in the social life of the individual?

4. Through the activity, may the objectives of general coordination and motor control be approached?

5. Will it have a beneficial effect on the qualities of grace and poise, and is it such that effective posture and carriage training can be associated with it?

6. Are achievement tests offered through which the student can be convinced of her progress toward her own objectives as she conceives them?

7. Does the activity possess a thought content that relates it to culture and education in general?

3. *Reaction to Activities Taken for College Credit; Ratio of Favorable to Unfavorable Opinion.*—

TABLE V

RATIO OF FAVORABLE TO UNFAVORABLE REACTIONS TO ACTIVITIES TAKEN FOR COLLEGE CREDIT

Indoor Activities	Number	Ratio	Sport Activities	Number	Ratio
Modern Dance	114	7.5	Crew	232	12.6
Tap Dancing	134	4.5	Riding	84	10.3
Folk Dancing	80	3.5	Hockey	159	6.6
Group Gymnastics	389	2.0	Basketball	134	4.6
Individual Gym.	107	1.9	Golf	205	4.5
Restricted Gym.	121	1.0	Tennis	301	2.4
			Outdoor Games	77	1.7
			Volleyball	154	1.0

An arbitrary limitation has been set in this part of the report to activities in which not less than seventy-five students participated for credit during their college career. In the questionnaire, students were asked (1) to state the ways in which each course taken for credit seemed to them to be of interest and benefit; (2) to state in what respects each credit course was not interesting and worth while. It may fairly be assumed that the balances of opinion shown in Table V are based largely on the values which the activities themselves, under the conditions under which they are taught, are believed by the participants to possess. Possible exceptions are crew and modern dance. The former has the advantage of a glamorous tradition and the latter may get the benefit of the upswing of the wave of interest in the new dance in this country.

The reader will immediately note and understand the low position of individual and restricted gymnastics, outdoor games, and volleyball in Table V, since their enrollment consisted largely of those who were

excluded from other activities by reason of physical disability. People who are ticketed and segregated for incapacity and subnormality, no matter with what kindly intent and manner the segregation is administered, are not, as a group and in their most private feelings, inclined to do justice to and appreciate the efforts made for their rehabilitation. This is the most baffling and the crucial aspect of the problem of the subnormal student—the apathy of the incompetent and unfortunate which seriously limits the scope of objective achievement in physical restoration. Reference will be made later to the steps that have been taken during the past three years toward a solution of the problem. The reasons given for favorable and unfavorable opinion repay close study, but are too detailed to be summarized here.

4. *Should Physical Education be a College Requirement?*—In view of the recent differences of opinion in various institutions in regard to the value of a requirement in physical education, it is interesting to note that the students of Wellesley Collge vote overwhelmingly for a requirement—84 per cent. The figures for the classes are:

Freshmen	79.1 per cent	Juniors	88.3 per cent
Sophomores	84.3 per cent	Seniors	92.2 per cent

This shows a gratifying increase in approval of 16.5 per cent, mostly attributable, it is to be hoped, to a growing maturity of judgment and the realization that with a requirement, time for exercise which is now not available in the press of the academic schedule would be officially set aside and allowed for; partly, it may be candidly suspected, to a disposition on the part of some upperclassmen to see to it that the underclassment continue to get what *they* got. There is, however, no patent evidence for this in the comments accompanying the votes on this question.

Only the leading reasons for favorable votes can be reported here. In 43.2 per cent of answered questionnaires the answer was, in effect: "Students won't take the needed exercise otherwise." Additional answers were:

17.3 per cent—General health and fitness
8.1 per cent—Recreation after academic work
5.3 per cent—Regular exercise necessary for habit formation
3.3 per cent—Physical education is an inherent part of education as a whole.

The total, 76.2 per cent, or over three-quarters of the students, give these sound and important reasons—a gratifying return.

On the other hand, another interpretation suggests itself. It is a common trait of well-intentioned persons to be willing deliberately to submit themselves to disciplinary requirement in frank recognition of weakness of will. This is normal, it may be said. But is it normal that almost half of a college enrollment should feel the need of thus rein-

forcing their determination? Might it not be suggested that for a large part of this honestly acknowledged need, an enhanced drawing power of physical education and the cultivation of a tradition of universal fitness could be substituted?

It is interesting to note that character and social values, as reasons for a requirement, fall into the middle rankings, about mid-way between Bowdlear's pupil (boys) objectives (concerned chiefly with immediate, tangible results) and his adult aims.[10]

A comparison of the reasons given on the unfavorable side with those reported in Alden's study shows a considerable difference.[5] The leading adverse reasons according to Alden's report of the situation at the University of Oregon were concerned with inconvenience and hurry in changing into and out of work clothing, the resulting feeling of untidiness, lack of adequate preparation in secondary school training, too short time allotments for each activity and the requirement of uninteresting activities. The explanation of this discrepancy lies in the fact that Alden's study was based on a prepared check list, whereas in this part of the Wellesley study, students were allowed to express whatever thoughts occurred to them.

5. *Attitudes toward the Gymnastic Program and the Sport Program.*—For the past quarter century gymnastics has been waging an uphill battle against altered tastes and attitudes of American youth. How, then, can one account for the 76 per cent approval of the gymnastic program, a program which by many has industriously been made to appear to be concerned only with physical correction, and which many would have us believe is indissolubly associated in the student mind with dull and futile routine. Is it a case of approval "in principle," as international diplomacy puts it? Or is it an indication that gymnastics in its newer forms, newer incentives, and motivation is able again to sell itself to the thoughtful student as an interesting and effective body builder.

If the youth of an entire nation can within a few years be swept into enthusiastic support of the severe Tanzgymnastik, it would seem as though, on the basis of our students' good will and open mindedness, they can be led, perhaps are being led, to appreciation and participation of a part of the physical education program which, when properly taught, provides the basis of body control and power. Perhaps, when our provincial egotism comes down from its perch and admits that in proportion to our population we are by no means the undisputed leaders in sports in comparison with nations the basis of whose physical education is gymnastics, there will be a general return to the constructive problem of removing the bad taste from gymnastics and demonstrating its fundamental values.

The definitely physical and health values as reasons for support of the gymnastic program have a higher ranking here than they do in sup-

port of the general requirement. "No carry over value" is the argument against gymnastics that occurs most frequently.

Regardless of what can or cannot be done with the gymnastic program, the vote for the sports program, as contrasted with the former, comes forth with an overwhelming conviction of a 94 per cent approval. Among the leading reasons given were large blocks of votes for exercise value, enjoyment, health benefits, development of skills, carry-over effects, recreation and relief, physical development, social values and variety, preference for the out-of-doors, cooperation through team play, and pleasure of competition. Among the forty-five dissenters, the reasons were trifling, and no one reason totaled as much as 1 per cent of the number responding to this part of the questionnaire.

6. *Voluntary Participation in Curricular Activities. Informal Participation in Extra-curricular Activities.*—Three-quarters of the answered questionnaires give as reasons for voluntary non-attendance in curricular activities: lack of time, lack of interest, schedule too heavy, participation outside department, more interest in other types of activity, physical handicaps, distance to gymnasium, preference for own time and place, and lack of skill.

Almost a third of the suggestions for making such voluntary participation more general had to do with allowing attendance at irregular times, scheduling activities at more accessible times, offering more varieties of activity (especially in the winter), having more class competition, more informality, more individual instruction, more accessible location.

There were 757 calls (of 823 questionnaires returned) for the use of college facilities for informal, non-instructional participation in the following activities, given here in order of precedence; ping-pong, bowling, badminton, swimming, fencing, squash, handball, tenniquoit, social dancing, basketball. There were small groups of requests for twenty other activities.

Here, the inference, after allowances have been made for the extravagance of youthful good intentions, is that students really want freedom, informality, variety, and competition in extra-curricular activities. This brings the responsibility to physical education so to enhance its drawing power, that what margin of time there is gets its fair share of participation in recreational physical activities.

7. *Preferences in Recreational Activities of Various Types.*—In connection with what has been said in the previous section, Table VI will be of interest. Nine common recreational activities were checked as first, second, or third choice; weighted and ranked as in Tables I and II. Many students called attention to the difficulty of deciding, inasmuch as circumstances have so much to do with preference from time to time. However, we assumed that by careful introspection some sort of an average balance which is fairly representative was struck by

the student. The consistency of Table VI seems to bear out this assumption. Because of lack of space we will let the figures speak for themselves.

TABLE VI
CHOICE OF RECREATION

Activity	Seniors Per Cent	Juniors Per Cent	Sophomores Per Cent	Freshmen Per Cent	Total Per Cent
Social Dancing	21	21	24	27	23.7
Reading	21	19	19	18	18.7
Theater	18	14	14	14	14.5
Exercise	11	11	11	11	11.2
Music	12	14	9	9	10.6
Conversation	9	10	11	10	10.1
Auto Riding	3	6	5	5	4.7
Bridge	4	4	5	2	3.8
Movies	2	2	2	4	2.8

8. *Reasons for Choosing Electives in Indoor Work.*—

TABLE VII
REASONS FOR CHOOSING INDOOR WORK

Reason	For Freshman Year Per Cent	For Sophomore Year Per Cent
1. Enjoyed it in high school	33	18
2. Interest in new activity	33	35
3. Reputation of activity	13	16
4. Because friends took it	6	4
5. Least of evils, not much choice	4	4
6. Enjoyed it in camp, outside of school, private lessons	3	5
7. Instructor's personality	3	10
8. Enjoyed it freshman year		5
9. Miscellaneous reasons	4	4

Topics 1, 2, 3, 4, and 7 were given in the questionnaire as a check list. The other topics were entered additionally by some of the students. It is interesting to note the stability of *previous enjoyment* and interest in *new activity* as reasons for election in both the freshman and sophomore year. These reasons (topics 1, 2, 6, and 8) comprise 66 per cent of all freshman and 63 per cent of all sophomore reasons. Enjoyment of past experience and anticipation of new experience are about equally represented. Contrary to the general impression, election in cliques and coteries is not common (topic 4).

9. *Reactions to the Motor Test.*—Tests of general motor ability and the conditions under which they are given vary so widely that there may well be some question of the generalized value of a report on a

test given in a single institution. However, despite this possible criticism and despite the fact that the tests given in the fall of the freshman year varied somewhat in content during the four year space covered by the questionnaire, the summary of answers is herewith given in the hope that it may be a contribution to our understanding of the student reaction to tests in general.

TABLE VIII
REACTION TO MOTOR TEST—PERCENTAGE YES

Question	Seniors	Juniors	Sophomores	Freshmen	Total
Did you enjoy taking it?	69	44	61	60	59
Did you do your best wholeheartedly?	90	87	69	84	81
Did you dislike it?	19	30	22	17	22
Did you feel that it was a fair test of your motor ability?	68	70	63	61	64
Were you indifferent?	21	30	22	23	24
Were you antagonistic?	8	1	3	1	4
Were you influenced by reports concerning the test?	16	12	25	34	24

Since no examination is supposed to be looked upon with much favor it might be considered a source of gratification that 59 per cent enjoyed the test, 81 per cent thought they did their best, and only 4 per cent were actually antagonistic. However, in view of the unique dependence of physical education upon good will and enjoyment, perhaps the figures, are, rather, evidence of the need of so constructing and administering such tests that they will call forth a much larger amount of student approval and cooperation; so that more will do their best, more will understand its purpose, character, and fairness, and fewer dislike it, or be antagonistic or indifferent.

10. *Attitude toward Acquiring Strength and Endurance.*—After the era of the Gibson girl, the age of glorification of the American outdoor girl began. It is a common impression that not a majority, perhaps not even a large minority of college women were ever in fact very enthusiastic about such glorification, and that they look with considerable suspicion upon low heeled shoes and athletic ankles and are inclined more to the appearance, at least, of Victorian languor and dependence. It was interesting to find from the questionnaire a confirmation of Anderson's findings among high school girls.[9] Four-fifths of those answering the question "Do you wish to increase your strength and endurance?" replied in the affirmative. The remaining fifth, who answered in the negative, had, it seems, excellent reasons.

In this part of the study, there seemed to be more evidence of a really vital and truly touching sincerity (on both sides of the question) than in any other part. The reaction to this question bearing on one

of the tangible and vital objectives of physical education seemed to indicate that here at least the student had come upon something that touched her life. Many of the reasons for the affirmative answers had an unmistakable wistfulness that makes one wonder if in our preoccupation with necessary but subsidiary matters of procedure and administration, we have not lost touch with essential purposes.

We can overlook the naiveté of the girl who wanted more endurance "but not by exercise," and we can recognize the thoughtfulness in many replies in which a distinction was implied between athletic endurance and the sort of general endurance that is fundamental to life's occupations as we find them. There is an abundance of sincerity in such reasons as these:

To do more things.
For greater enjoyment in athletic, social and academic activities.
Better vitality.
Normal ambition.
Valuable asset.
Look and feel better.
Helps in personality.
For health in later life.
Dangerous to be at the borderline and not be able to work.
To develop ability and proficiency in sports.
Need them—in dancing, in social work, at camp.
Want to be able to play hard without fatigue, to last longer in sports.
Find plenty of use for strength on brothers and in a rural community.
I have very little endurance and it makes me ashamed.
Embarrassing to be a softy.
Have always admired people who can do things.
Would like to increase strength and endurance but have not felt that any gym course so far has been beneficial enough.
To ward off old age (truly an optimistic hope).

On the other hand, among the 20 per cent who are by no means desirous of increasing their strength and endurance we find in practically every case a perfectly valid reason, delivered with a vehemence that comes from the heart with Wagnerian emphasis fortissimo:

Judging from my appearance I realize I was not meant to be an athlete.
Above average in both, strong enough, don't need it.
Am in excellent health.
Have enough to get along and still be ladylike.
I'm quite strong and durable now.
Would rather develop skill.
Too many other interesting things to do in life.
Don't want to lose grace of feminine figure.
Don't want to be an Amazon.
Don't want to look like a pugilist when wearing evening clothes.
Want strength, but not to the Amazonian stage reached by most physical education students.

The question may be asked, why strength and endurance do not appear conspicuously among the reasons for "wanting to take" and "thinking they ought to take" certain activities. The answer is obvious: because in American physical education for college women, the activities are for the most part so conducted that it does not occur to the student that these measurable and fundamental objectives are supposed to be part of the game. When the question is put specifically, the students' answer is ready and emphatic.

SUMMARY

In general, this study confirms the favorable attitude of college women toward a requirement in physical education and a preponderance of opinion in favor of rhythmic activities and individual sports. It also shows a rather surprising endorsement of the gymnastic program, and a real interest in the *body training* objectives of physical education.

The marked individual differences in the choice of activities justify as wide a variety of offerings as is financially and administratively practicable for both the curricular and extra-curricular programs.

PRACTICAL APPLICATIONS

The faculty and professional students in the Department of Hygiene and Physical Education at Wellesley College have found this questionnaire study to be a valuable source of information and inspiration in connection with the ever present problems of curricular revision and administration. By meeting student interests more fully, it has been possible to secure greater cooperation and better extra-curricular participation.

The results of this project have undoubtedly sharpened our appreciation of one of the most important needs in physical education—that of bridging the gap between immature student objectives and those of the mature teacher—in other words the need both of learning the inexperienced student point of view and of teaching not only activities, but the reasons underlying our objectives and procedures.

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"Physiculture" in the Soviet Union

By Percy M. Dawson, M.D.

AFTER attending the International Physiologic Congress which was held in Leningrad and Moscow in August, 1935, and participating in a considerable tour prepared for the members of the Congress, I continued to reside in the Soviet Union in order to become acquainted with what was being done there in physical education and in the physiology of sport and labor. One of the results of this sojourn is the following article.

This article has certain limitations, both original and present. In respect to the former, I did not visit the Institute at Kiev; in regard to the latter, I may say that owing to the fact that the various institutions which I did visit differ from one another and that the space allotted to this presentation is necessarily limited, it follows that a number of my statements are only approximations of the truth. However, the matter has seemed to many so important that I hasten to share my observations with my colleagues.

INTRODUCTION

The advancement of physical education in the Soviet Union is the task of the Supreme Council of Physical Education, which meets in Moscow. This council is appointed by the Central Executive Committee of the Soviet Union and is responsible to the latter. It is composed of outstanding active or formerly active physical educators. The autonomous republics have their own Councils for local affairs. The Supreme Council, doubtless in collaboration with the military and medical authorities, has two sets of requirements, junior and senior, the former being simpler than the latter. The fulfillment of these requirements entitles one to the first or second degree badge. Both badges carry the motto "Ready for Labor and Defense." The second set of requirements is very comprehensive and arduous. It consists of a wide range of athletic and gymnastic achievements, the ability to lead classes in mass athletics and to give a lecture on the physical education movement, etc., military athletics ("weighted athletics"), military knowledge and practice, sanitary and medical knowledge and practice, and a very high degree of industrial efficiency (see Appendix).

There are two journals devoted to physical education, named *Physical Culture and Sport* and *Medicine and Physical Culture*. There is also a newspaper entitled *Red Sport*, published on the odd days of the month.

There are annual congresses of the teachers and researchers from the Institutes of Physical Education, but meetings of those who teach physical education to the "laity" are irregular and uncommon.

THE INSTITUTES

There are six institutes for training teachers of physical education, each giving a four-year course for prospective physical educators, a two-year course for sportmasters, and courses for physicians or medical students who expect to become sport doctors. The Leningrad Institute gives also a three-year course for dancers, a very significant undertaking. The demand for physical direction is greater than the supply, and the deficit is at present met by (1) itinerant physical educators who confer with the leaders of sport circles, and (2) sportmasters from the technical colleges and independent schools for sportmasters, both of which give a two-year course.

The work of the Institutes is divided between teaching and research. For the most part the departments (chemistry, pedagogy, etc.,) elaborate their own researches, but frequently two or more departments cooperate in a specific investigation. One institute has a director of research. The latter classifies the investigations under four heads: physical education in relation to (1) education, (2) industry, (3) therapy, and (4) defense. Examples of these researches follow:

In industry.—The curve of production of the tobacco workers of Georgia (mostly women) rises during the morning to the maximum and later falls until interrupted by dinner, and the afternoon curve is similar. The fact that the work involves much standing suggested the following procedure. About the time of the onset of the slumps which succeed the maxima of production, a ten-minute recess is called. For three minutes operatives lie still on couches and try to relax; one minute deep breathing; three minutes while supine, conical, bicycle and other movements made with legs; three minutes walking about at first, but later in the experiment ball playing was substituted. An improvement of production resulted in 2.3—2.5 per cent in machine work and 26 per cent in hand work. (Published in Russian.)

In education.—Two groups of forty children each were observed. The sequence was as follows: three lessons of forty minutes each, mental tests, recess, three lessons of forty minutes each, mental tests or report of teachers regarding the preceding three lessons. In the use of the recess, the two groups differed. One group rested; the other took active exercise. The advantage was strongly in favor of the second group as shown by tests and teachers' reports. (Published in Russian.)

In medical science.—(1) Standardization of exercises based on oxygen consumption (published in Russian). (2) Effect of vestibular stimulation on blood pressure, pulse rate, and respiration in persons devoted to different sports, trained and untrained (published in German).

(3) Study of the different types of nervous system in participants in different sports by the method of striking out letters (to be published in Russian). Regarding the last, sprinters, for example, are fidgety, do the task quickly, but make many errors; runners of 3,000 m. or more do the work slowly, quietly, and accurately. This is true of both sexes. The anthropologists have cooperated and found that the types of nervous systems correspond to Kohlrausch's types of physique.

In therapy.—The effect of swimming on heart cases at the sanitaria at Sochi on the Black Sea has been studied by members of the Leningrad staff (extramural research).

An important characteristic of research in the Soviet Union is the use of consultants, persons belonging primarily to one organization and secondarily to one or more others. Thus the director of the laboratory for the physiology of animal movement at the All-Union Institute for Experimental Medicine has developed a technique, both experimental and mathematical, which is suitable for the study of the movements of athletes and gymnasts. Hence he is employed as consultant at the Institute for Physical Education. Here under his direction, experiments have been performed in which the gaits of the best Soviet runners were photographed, analyzed, and compared with the gaits of less successful runners. This leads to conclusions of advantage to coaches regarding the evaluation of different styles of running. Similar studies are being made of gymnasts.

Connected with research and its applications are the workshops in some of the Institutes. Here are made all sorts of sport appliances—skis, foot gear, etc., according to the specifications of members of the research staff. Should such experiments prove successful, the articles can be made in quantity elsewhere.

THE CURRICULUM

To enter the Institute, one must have graduated from the "middle school," (v.i.), be physically sound, and be "ready for labor and defense" to the extent of the first degree.

The curriculum is half academic and half practical, so that plenty of time is allowed for the acquisition of numerous physical skills. The subjects of study follow:

General Education.—Under the loose term political subjects are included evolutionary materialism, ordinary economics, principles of soviet industry and agriculture, and history of the Communist party. Naturally this implies a study of the works of Marx, Engels, and Lenin; German (German or English at Leningrad); mathematics including statistics; physics; chemistry—inorganic, organic, and biochemical; biology, evolution, effects of heredity and environment.

Special Education.—Anatomy with dissection and histology; physiology; hygiene—general, social, and school; medical control; sport

traumatology; massage; pedology is not so much a new science as the regrouping of materials; psychotechnics, largely an equivalent of physiology of the special senses; history of physical education; psychology, largely educational; organization and general methods; adaptation, e.g., to operatives, infants, Red Army, etc.; kinesiology and corrective gymnastics may be with anatomy or form a department of biomechanics; dietetics may be a part of hygiene; "self control" may be separated from hygiene and medical control; anthropometry may be part of some other department. Physical chemistry functions apparently only in research. Photography and tourism are given in Baku, which is near the great mountains.

It is stated that the courses in physiology and other medical subjects are of the same grade as those given to medical students (Moscow).

Special Sport Techniques, Theory and Practice.—Gymnastics is everywhere regarded as fundamental; *batoud,* a closely-woven, tightly-stretched, cordage platform which acts as the springboard but projects the performer directly upward; *wheel,* two wheels about seven feet in diameter and about eighteen inches apart at all points. These are rigidly connected together and the performer steps between them, spreads his arms and legs, grasps foot holds and hand holds and by adjusting his weight causes the wheels to rotate in a vertical plane and himself to go around with them; parachuting, formerly optional; boxing, very popular; volleyball, very popular; dancing, folk and mass; wrestling, Greco-Roman and Georgian, not catch-as-catch-can; fencing, rapier and broadsword; hockey, ice, not field; soccer, which draws immense crowds; weight-lifting; swimming; skiing; skating; cycling; basketball; tumbling; and jujitsu.

Rugby is not allowed; lacrosse, baseball, golf, and rounders are not yet introduced.

An interesting feature of physical activity is its informality. I have seen two hundred students doing free gymnastics in the roadway while the leader stood on the steps of the University. These students made no change in costume whatsoever, not even taking off the winter overcoats which many of them wore. Some of the same students practiced sprinting in the same roadway after removing their coats. Acrobats will take off their shoes and shirts and are then ready to perform. Many physical education students of both sexes habitually use their gym suits for underwear. It is important to take very hot baths for cleanliness and health but there is no direct connection between bathing and exercise!

In spite of the fact (or perhaps because of it) that even in mixed classes the women habitually wear little more than bathing suits, and men go shirtless or even with a supporter only, I have never seen any conduct between the young people suggesting consciousness of sex.

Defense.—Shooting, special gymnastics, weighted athletics, gas-mask work, etc.

The equipment of the Institutes varies considerably from one institution to another. The gymnastic equipment is everywhere excellent and abundant. The institutes either have their own stadia or have access to the excellent stadia of Dynamo (v.i.). None of the institutes have their own swimming pools, but several of them have access to such.

The libraries are of variable extent, but share with all Russian libraries the defect of a bad system of arrangement and cataloguing. Of course, the newer libraries cannot be supplied with the older foreign files, but must be content with current foreign journals and with borrowing from the older Russian libraries.

The students are absent from the Institute for four months of each year. The men spend the first two in camp under the direction of the Red Army instructors. During this period the women have a "tent course," which includes first aid, red cross nursing, gas-mask work, etc.

Both sexes spend the next two months together on vacation at rest homes for students in the country, mountains, or at the sea-shore.

The requirements for graduation as a physical educator from the Institutes are: (1) completion of the regular work; (2) achievement of the second degree of readiness for "labor and defense" (which usually occurs by the end of the first year at the Institute); and (3) achievement of the rank of sportmaster of at least the first category (there are three such, corresponding to the expertness). It should be noted that it is not sufficient to excel in a single activity. One must be an expert in one of the six or seven groups of related activities. Furthermore, one who has shown an aptitude for research is not required to be a master of a sport at all. Those who graduate merely as *sportmasters* from the Institutes have had the same subjects as the physical educators but less in amount. For example, in physiology the physical education students have 152 hours and the sportmasters 110 hours. But sportmasters coming from some independent coaching schools (Tiflis) have had practically no theoretical instruction.

The ideal training for the sport doctor is graduation both in medicine and in physical education. This training would require nine years were it not for the fact that the two disciplines overlap to some extent. Again if a medical graduate has become attached to a sport circle (there having been no better trained person at hand) and there acquired some practical experience, or if a medical graduate has been himself an athlete, then in either case, the time spent at the Institute for Physical Education is correspondingly reduced.

Similarly the instructors in Physical Education for the Red Army are either graduates of both a Military Academy and an Institute for Physical Education, or, if the military academy is very large so as to have a full-sized physical education department of its own, then their whole course may be at the one and same institution.

The only exams I have seen are those for sportsmasters in gymnastics. What impressed me most was not the fact of the excellence of the performance, but rather that such arduous exercise caused so little shortness of breath and practically no sweating. This accounts in part for the fact that these sportsmasters, having completed their test, do not put on sweaters or blankets but walk about leisurely or even sit for half an hour or so in the cool sport hall in the same uniform in which they took their examination.

MEDICAL CONTROL

Considerable medical control is to be expected within the Institutes. Every student is examined twice a year by the doctors belonging to the Institute assisted by specialists (throat, nose, etc.) from town. In addition to the tests usually given to the resting subjects, the effect of different amounts of work is determined. The student is also questioned as to his athletic history and aspirations. Besides these regular examinations others are held when required and the general supervision of the work of the Institute is maintained as in the following. Gymnastic dancing is often very strenuous. A new class or the new set of dance movements demands medical supervision. The simplest way to check up on the dancers is to chart their pulses during the dance. For this the doctor hands out pencil and paper; at the word of command the student begins to count his own pulse, and at the word of command, he ceases to count; he writes down his score. This is done before the dance begins and is repeated five times during the dancing period (90 minutes) and also after it is over. Here a high pulse rate is not regarded as necessarily dangerous, but as a signal for further investigation.

A further example of medical control is seen in the restrictions imposed upon women. Women students are not allowed to box, wrestle, lift weights, do "deep" jumping, i.e., jumping down from a height, or to play soccer. (They must study all these things just as the men do.) Soccer is so "unladylike" that many Americans would condemn it on this ground alone. I asked a number of Russians about this. Some said that women in sports should never be permitted to come in contact with each other, but they could not tell me why. The director of the Leningrad Institute said of soccer, "We have no evidence. Maybe it would be good for them;" and the woman superintendent of the women's division in Tiflis also recognized the doubtful nature of this prohibition. Moreover, women students are forbidden to take part in practical work during menstruation. In Baku this used not to be the case, but I was told that the women overdid at this time so that the prohibition is now complete. Again in hockey the men play stooping (Canadian game); the women play erect (European game). On the other hand the women play basketball by men's rules.

But medical control is active everywhere. Rugby football, whether of English or American type, is forbidden as dangerous. Boxing is surrounded by so many restrictions that its danger is greatly reduced. Two doctors are stationed at the opposite corners of the ring to inspect the combatants before and after each round. When blood is drawn the permission of the doctor must be obtained before the match can continue. If one combatant knocks the other down, the match is declared finished. If one of the combatants seems much superior to the other, the match is called off. The match cannot be continued more than five or six rounds. The gloves are always of full weight.

THE FIELD OF ACTION

The aim of Physical Education in the Soviet Union has been stated in two ways which differ only in respect to emphasis. It is a process for securing; (1) fitness for labor and defense; and (2) health and fitness for defense. This being so, it is desirable to extend the benefits of physical education to all persons, and naturally much thought is given to adaptation not only in the case of groups, but also the case of individuals. There are inhibited, timid types who must be especially dealt with. Here physical education and mental hygiene must cooperate. We shall discuss some of the categories of persons for whom exercise has been especially adapted in the Soviet Union.

In the District Exhibition for the Protection of Maternity and Infancy there are charts and directions for the guidance of pregnant women. The exercises are as follows:

1. Supine, drawing up the knees.
2. Bridging on soles and shoulders.
3. Leaning upon the back of a chair and pushing the body up to the vertical with the arms.
4. Supine, raising the legs.
5. Standing and swinging the arms horizontally with turning of trunk from side to side.
6. Hands on hips, flexion of the body to the right and left.
7. Kneeling, bending backward.
8. Deep knee bending. (Moscow)

In a maternity hospital I witnessed the following: the exercises begin at the end of 24 hours after delivery, and are preceded by a talk by the doctor explaining the reasons for giving them. *Second day:* (1) Supine, arms extended laterally palms toward feet, arms raised to above the head with palms pressed together and so kept as arms are brought down in front and extended toward feet. (2) Right arm behind head, left arm follows the side of the body as far toward the feet as possible. Same on other side. (3) Both knees drawn up and extended again, four times. (4) Repeat 1. *Third day:* To the above add

(5) bridge on soles and shoulders, five times. *Fourth day:* Add (6) raise the body to sitting posture without the help of the hands, four times. *Fifth day:* (7) To the above add number 1. If the woman remains more than five days in the hospital, the *Sixth day* add (8) cycle riding movements of the legs. Knees drawn up, knees spread apart, legs extended. *Seventh day:* Add (9) prone, push up with hands bending at the knees. (The pulse of one of the women who did all the exercises appointed for the fifth day was 66 before and 78 after.) (Kharkov).

In House of Infancy, No. 6, in Moscow, I saw the following: Windows are closed, sheet and blanket laid over a hard table, baby undressed. A girl of about nine months and very wriggly. Light (skin) massage of the arms; arms outspread and then brought across the chest briskly a couple of times. Baby wriggles and seeks to turn over, but is deftly rolled back again. Light massage of the legs, soles, and margin of foot; soles pressed to cause "negative Babinsky"; brisk passive movements of the ankle joints; light massage of the back; back drummed upon rapidly with the backs of the fingers; baby supine, forearms grasped and baby caused to make brisk boxing movements with arms alternately; abdominal massage; legs grasped and flexed upon trunk; baby stands supported by hands on thighs and encouraged to stoop twice to pick up rattle; baby supine, grasps fingers of nurse who raises her to sitting posture flexing trunk on thighs; supine, bicycle movements of legs; with feet on table, body is arched backwards over hand of nurse; walks a few steps with support; supine, both legs grasped at once and rotary movement given to pelvis; bridging with feet held and back supported; supine, grasps finger of nurse with one hand, nurse raises baby to sitting posture; same other hand; standing alone (with precautions); bending sidewise with feet held and flank supported; same other side; bridging and passing over into a sitting posture; baby allowed to sit alone; head down suspension by ankles; trunk supported in prone position by the hands, baby holding up its own head and legs; same, baby supported in supine position; placed on hands and knees to go after rattle, which she does moving like a squirrel.

One notices the delight of the baby over this procedure, also the remarkable deftness of the nurse. She has been handling babies for 15 years, and tosses the child through the movements, as it were. I was told that the regular physical educator was even more expert. The latter was absent that morning. These exercises are begun at two and one-half months. Each baby is put through once in 24 hours. There are 115 babies and a total staff of 93, including 2 doctors and 47 nurses.

In a nursery school in Kharkov there are 250 children. A class of 22 children enters, marching in twos to the piano (ages four and five). They wear shoes with stiff soles, stockings to above the knee, a narrow

band of exposed skin of the thigh, snug black shorts, a blue long-sleeved jersey, and occasionally a colored bow in the hair, which is pretty short. Each carries a wallet slung over the shoulder containing a handkerchief (younger children have no handkerchiefs.) The leader and some of the others march well. A circle is now formed with teacher at one side and the following exercises take place. The teacher pretends to be cold and beats her body with her swinging arms like a cabman warming himself. The children do the same, all making noises indicative of being cold. The teacher, stooping, rubs one ankle, then the other, imitated by the children. Lying prone she raises her head as high as possible; standing, wipes one foot against the other. The children imitate all this. The children next crowd toward the end wall of the playroom and place themselves in a long line with their backs against it. The teacher and her assistant meanwhile place two long benches end to end across the room, also two strings parallel to the benches. At the word the children get down on all fours and crawl (or scamper) over one of the benches and under the two strings in succession, then sooner or later turn and go back the same way. The children now gather about the teacher, who has two flags. When she holds up the green one, all the children walk about making a great clatter with their shoes. When the red one is held up, all movement ceases. After a few trials the flags are given to a child who stands with them on a chair. Then some more marching. As the children pass me on the way out I scrutinize their faces. Some of them are smiling as though enjoying the sport, but others look amusingly serious. They seem not yet to have grasped what all this is about. The faces of the three-year olds, whom I saw perform also, were still more serious! These children have a complete medical examination four times a year, including motor ability and anthropometry.

For children in the lower schools (eight to twelve years), Physical Education is not yet in a satisfactory state owing to overcrowding. In general, the lessons come only once a week. The aim is to promote coordination rather than strength. The building of schools is proceeding at a rapid rate and an All-Union law calls for a gymnasium in all the new schools. Meanwhile some schools are doing pretty well with the dining rooms or reception rooms of the old nobility. In schools for the handicapped, e.g., the deaf, where the classes never contain more than twelve children, such make-shift gymnasia may be used to great advantage. In the middle schools (twelve to eighteen years), the situation is on the whole much better. In Moscow, classes meet from two to four times a week, depending on facilities, and in Tiflis three times.

Of course, in addition to the required physical education, there is the voluntary work of the "circles." The latter are connected not only with the schools but also with the Houses of Culture of the Unions and with the Children's Palaces. There are, for example, 1,400 children

in Kharkov who have signed up for work (or play) at the department of physical education at the Pioneer Palace. Here the sport hall is exceptionally attractive with its fine wood floor. It has a volleyball court, and there were a couple of boys in gym suits apparently awaiting the arrival of others, for it was early in the afternoon. All children who take physical education here are examined in the adjacent department of first aid and medical control. If a child is found to be abnormal, he is referred to the school doctor. If the latter believes that the abnormality does not contra-indicate exercise, or indeed may be benefitted by the right kind of exercise, the child is referred to the hospital clinic, and either there or at the Institute for Physical Education, he is given appropriate treatment. The first-aid service mentioned above has little to do with the physical education; its patients usually come with injuries acquired in the shops.

In this building there are also rooms where classes are held in mass dancing, classic ballet dancing, and gymnastic dancing. The last two are conducted by a teacher from the Institute.

Knowing that there is a great deal of competition in sport in the Soviet Union, I asked whether inferiority complexes did not arise in children who are habitual losers. The answer was that the school tends to emphasize cooperative activity and that competition, even in sport, plays an insignificant rôle.

For students in the "high schools," i.e., universities and technica, physical education comes two to four times a week, depending upon the institution, and is largely under the supervision of the Red Army. Here the object of the instruction is to equip the students for passing the tests for first and second degrees of the "G.T.O." (Ready for Labor and Defense.)

The gymnasium of Dynamo in Baku is not large. It has a floor of oak blocks. The end walls are green, the boards back of the two baskets are slate gray. The rest is white, but the side opposite the windows is covered with stall bars of the color of black walnut. The daylight comes all from one side and is good. At night the artificial light is all reflected. Apparatus is abundant. One seldom sees a room so pleasant and homelike. This evening an advanced class has come; it is a club class, and is made up of workers from various factories: six men and seven women, ages from eighteen to twenty-five years. They wear white, tight jerseys with short sleeves and blue bands for collars and cuffs. The men also wear trousers of the usual type, long, snug, black, and fastened to the shoes; the women wear black, full length tights. Before long most of the men have taken off their shirts.

As usual marching and calisthenics begin the series but soon a second instructor appears and the men and women separate for apparatus work. I note that all the women can do the shoulder stand and roll on the parallel bars, and several can kipp up from a hanging swing.

Then comes the running long jump. The participants are of both sexes. It is a social gathering and not a competition. You jump as well as you can but no score is kept. Also the jump is made in various ways, the demand being for coordination rather than distance. Also there is jumping and leap frog over several persons. A mixed team game requiring speed and steadiness, a sort of relay, is then played. Marching closes the performance. There has been much laughter throughout the evening.

I have also seen a class of workmen, beginners, at this gym. They come on two mornings of the week and give evidence that physical education in the schools of Baku has been instituted since they were school boys.

The application of physical education to therapy is everywhere recognized, but in addition to this, physical education is practiced as a hygienic measure in many hospitals.

FACILITIES

Dynamo is the All-Union private club of which the object is to provide facilities for sport. It is supported in part at least by the sale of sporting goods. The equipment in different cities varies a good deal. In Leningrad, the Club has two football fields, a number of tennis courts, two tracks, a basket- or volleyball field as big as a football field, two shooting galleries each 400 meters long, a restaurant, comfortable clubrooms for the sportmasters, extensive medical division with two doctors, assistants, clinical laboratory, two X-ray outfits for vertical and horizontal use respectively, ultra-violet light baths and massage, and an anthropometric department.

There are plans for more tennis courts and a swimming pool. The architect with whom I visited the plant also told me that they were expecting to build a stadium in Leningrad with seating capacity for 100,000.

I have already referred to the sport hall of the club house run by Dynamo in Baku. The small rooms and outdoor facilities were much used by the students of the Institute at the time of my visit, as their own buildings were under construction. At Dynamo, the outdoor facilities consist of a single football field, a track, and some tennis courts. The roof of the building, which is a most modern glass and iron structure, is equipped for insolation with a men's and a women's section, and the doctor's office between.

The parks of culture and rest offer numerous sport facilities. At one of these I have seen instruction being given in boxing, acrobatics, etc., and also two hundred or more couples engaged in mass dancing. The steps were called with a megaphone and illustrated by five couples of physical educators placed at regular intervals inside the huge circle. Many sport circles make use of the tennis courts. (Moscow.)

Many city parks are entirely closed in the daytime to adult visitors, being given over to children for supervised recreation. In one of these there are running races, rowing races, volleyball, mass dancing to a band of nine instruments, a library, and an outdoor reading room. For the little children there were a nursery playground, cots for naps, and bottles of milk. Everywhere were trained physical educators, nurses, doctors, and properly qualified parents. (Leningrad.)

APPENDIX

The following series of physical educational and medical requirements are taken from the handbook entitled *Ready for Labor and Defense*. In this book two lists are given, one leading to the first degree, the other (marked here with a star) to the second degree. My list is incomplete in many respects, e.g., no reference is made to substitutions, such as the tractor for the bicycle, horsemanship for skiing, etc. Also the norms given are only for men and women (requirements for women, where shown, are the second set of figures, given in italics), aged eighteen to twenty-five; norms for older persons are omitted, as also all the requirements of a purely military or industrial nature.

Run 100 m. 14.5″; *16″*; 1000 m. 3′30″; *500 m. 2′*.

*Run 60 m. with complete war equipment and rifle, start lying down and then finish lying down, 11.5″; *without rifle, 12.5″*.

*Run cross-country in sport clothes 5 km., 21′; *1 km. 4′*.

Surmount 400 m. of military obstruction with military equipment and rifle, start lying down, 2′20″; *200 m. without rifle 55″*.

Running long jump 4 m.; *2.80 m.*

*Running high jump 1.40 m.; *1.15 m.*

Swimming 100 m. 2′20″; *2′40″*. 400 m. 10′; *200 m. 6′*.

Swimming against the current.

*Deep diving and picking up objects 5 m.

Jumping into the water head first from a height of 5 m.; *3 m.*

Practical knowledge of the principles of rescue in the water.

Throwing 700 g. 35 m.; *25 m.*

*Gymnastics (free and with apparatus).

Pull up 6 times; *climbing rope or pole 3 m.*

Bicycle ride over 60 per cent highway and 40 per cent country road, 20 km. in one hr.; *10 km., 40′*.

Skiing cross-country in sport clothes 20 km., 2 hrs. 10′; *5 km., 36′*.

*Marching with complete military equipment (1 km. in gas mask) 35 km., 5 hrs.; *with tourist equipment 25 km., 6 hrs.*

*Rowing without rudder and without turning around to look, 2 km.; *1 km.*

*Competitive participation according to season in football, basketball, hockey, water polo; *basketball, hockey, water polo.*

*Practical knowledge and ability to use the following methods: wrestling, boxing, ju-jitsu; *ju-jitsu.*

First aid in accidents and in sudden sickness.

*Knowledge amounting to that of junior medical technicians.

*Sanitary hygienic knowledge and practice. Knowledge of sport massage. Knowledge and practice of the demands of preventive hygiene and technique of safety.

Daily gymnastic exercises.

Knowledge of the principles of physicultural self-care.

Fulfillment of the sanitary minimum.

*To be able to conduct a discussion, report upon the principles of Soviet physical education and upon the international workers sport-movement before a group of not less than twenty people.

*To have been an active member of the physical education organization, judging and conducting a class of not less than ten through the gymnastic series leading to the first degree, changing the norms to suit special types.

Men only:

Raise 32 kg. from ground to shoulder and walk with it without stopping 50 m., four times.

*Ski jumping with take off 12 m.

A Study of the Tendency of School Children to Develop Flat-Footedness

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IT IS generally thought that our modern civilization is conducive to the development of flat feet. Various theories have been postulated in an attempt to explain this. It has been mentioned that the type of footwear, the lack of use of the feet, and walking and standing on hard surfaces are contributing factors toward the development of flat-footedness.

In past years the physical examination records of school children have indicated an increased tendency toward flat-footedness. However, the foot measurements used have been largely subjective ratings. Few attempts have been made to trace the tendency toward flat-footedness by applying objective measurements to large groups of children.

The purpose of this investigation is:

1. To develop a method of measuring footprints whereby an index can be secured for comparing the results of foot measurements on various age groups.

2. To determine if there is a progressive tendency toward flat-footedness among elementary and high school children.

PROCEDURE

After experimenting with various ways of taking footprints, the pedograph machine was finally adopted for use.[1] The use of the pedograph machine in taking footprints has the advantage of cleanliness over methods in which the bare foot is painted or inked. It is also more economical of time.

The technique for making footprints with the pedograph machine has been adequately described by Clarke.[2] The essential points in obtaining a reliable print are:

1. The feet should be bare.
2. The pedograph machine should be properly inked.
3. The subject's heel should be placed against the steel plate of the pedograph machine before touching the rubber sheath.

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[1] Scholl Mfg. Co., 211 West Schiller Ave., Chicago.

[2] H. H. Clarke, "An Objective Method of Measuring the Height of the Longitudinal Arch in Foot Examinations," The Res. Quart., IV (Oct., 1933), p. 102.

4. When the subject places his weight on the rubber sheath, he should not rock or wobble.

5. The entire weight of the body should be placed on the foot being tested by removing the opposite foot from the floor.

Methods of Measuring Footprints.—Since footprints on a large group of children represent the imprint of feet from those completely flat to those with extremely high arches, it was necessary to develop a method of measuring various types of prints.

The method used in measuring footprints was to draw a line (Fig. 1), by the use of a straight-edge, which bisects the outside points of the medial border of the foot. This line usually extends from the os calcis to the base of the first metatarsal bone. The drawing of the line to represent the medial border of the foot is identical to the method used by Schwartz, Britten, and Thompson in obtaining the footprint angle.[3] This line representing the medial border of the foot completes the boundary of the non-contact area as shown in Fig. 1, B. The non-contact area is that part between the inked area and the line representing the medial border of the foot. The contact area as shown in Fig. 1, A, is the inked area of the foot with the exception of the toes.

The contact and non-contact areas were measured with a planimeter and the results recorded in square inches. The ratio of the contact to the non-contact area was obtained by dividing the non-contact by the contact area. This ratio represented the footprint index which was used for comparing footprints of various sizes and for different age groups. The footprint index is interpreted as a measure of the height of the longitudinal arch, that is, the higher the index the higher the arch.

In a number of cases footprints were obtained with double-contact areas as shown in Fig. 1, C. In these cases the longitudinal arch of the foot is so high that the imprint is completely detached between the metatarsal heads and the heel. These extremely high arch footprints were not measured with a planimeter, but instead a percentage of those occurring at each age group was determined.

Reliability of the Method.—In order to establish the reliability of the footprint index described in this paper, 100 footprints were taken of the same group on two different occasions from a random sampling of elementary and high school pupils. The reliability coefficient computed from the indices of the two sets of footprints was .982.

Objectivity of the Method.—To determine the objectivity of the footprint angle, fifty footprints were taken on the same group from a random sampling of elementary and high school pupils by two different experimenters. Each measured and computed the indices for his own

[3] Lows Schwartz, R. H. Britten, and L. R. Thompson, "Studies in Physical Development and Posture," *U. S. Public Health Bulletin*, No. 179, 1928, p. 23.

set of footprints. The correlation of the indices obtained by the two experimenters was .979.

THE DATA

The subjects for this experiment were 676 school children ranging in ages from 6 to 18 years. Of this number 323 were boys and 353 were girls. Footprints were taken of both the right and left foot of each subject. A total of 1352 prints was secured. Fig. 2 shows the distribution curve of 1148 footprints. The 204 footprints not included in this curve were those with extremely high arches giving double-contact

Name ..... Date .....

Age ..... Grade .....

Non-contact area .....Sq. in.

Contact area ..... Sq. in. Index .....

FIG. 1. The method used in recording foot measurements. A, contact area; B, non-contact area. C shows a double-contact area footprint.

areas. Indices were not obtained for those prints having double-contact areas, as previously mentioned.

Table I shows the number of cases and the mean index of each foot for both boys and girls at the various age levels.

Table II shows the number and percentage of double-contact area footprints occurring at the different age levels for the boys and Table III shows the same for the girls.

TABLE I

NUMBER OF CASES AND MEAN INDICES FOR BOYS' AND GIRLS' FOOTPRINTS AT THE DIFFERENT AGE LEVELS

	Boys				Girls			
Age	No. of Cases rt. ft.	Av. index rt. ft.	No. of Cases lt. ft.	Av. index lt. ft.	No. of Cases rt. ft.	Av. index rt. ft.	No. of Cases lt. ft.	Av. index lt. ft.
6	24	.27	25	.26	27	.22	29	.24
7	19	.33	20	.33	22	.34	20	.31
8	15	.26	13	.24	12	.33	12	.32
9	18	.30	18	.27	20	.36	17	.38
10	28	.32	27	.33	17	.38	18	.38
11	16	.39	15	.38	23	.37	22	.36
12	17	.34	15	.36	32	.34	31	.33
13	28	.37	28	.36	18	.36	17	.39
14	44	.36	43	.37	28	.31	27	.35
15	19	.29	19	.33	30	.36	26	.39
16	30	.37	28	.37	20	.30	22	.33
17	30	.31	29	.32	26	.35	26	.35
18	10	.37	10	.34	9	.31	9	.34
Total	298		290		284		276	

TABLE II

DOUBLE-CONTACT AREAS AND PERCENTAGES AT THE DIFFERENT AGE LEVELS (BOYS)

Age	No. of cases in group	Double-contact rt. ft.	Per cent double-contact rt. ft.	Double-contact lt. ft.	Per cent double-contact lt. ft.
6	26	2	8	1	4
7	22	3	14	2	9
8	17	2	12	4	23
9	23	5	22	5	22
10	31	3	10	4	13
11	17	1	6	2	12
12	19	2	11	4	21
13	32	4	13	4	13
14	46	2	4	3	4
15	20	1	5	1	5
16	30	0	0	2	7
17	30	0	0	1	3
18	10	0	0	0	0
Total	323	25	8	33	10

Fig. 3 shows the curve of mean indices occurring at the various age levels for both boys and girls.

DISCUSSION

Fig. 2 shows that the footprint indices of a large group of children approximate a normal distribution. The range in indices for the 1148 footprints is from .03 to .67. The mean index for the entire group is .33.

TABLE III

DOUBLE-CONTACT AREAS AND PERCENTAGES AT THE DIFFERENT AGE LEVELS (GIRLS)

Age	No. of cases in group	Double-contact rt. ft.	Per cent double-contact rt. ft.	Double-contact lt. ft.	Per cent double-contact lt. ft.
6	31	4	12	2	6
7	26	4	15	6	23
8	15	3	20	3	20
9	24	4	17	7	29
10	27	10	37	9	24
11	28	5	18	6	21
12	38	6	16	7	18
13	21	3	14	4	19
14	32	4	13	5	16
15	36	6	17	10	28
16	25	5	20	3	12
17	35	9	26	9	26
18	15	6	40	6	40
Total	353	69	17	77	22

Table I shows that the range in mean indices at the different age levels for the boys' right feet is from .26 to .39. The mean index of the boys' right feet for all age groups is .33. The range in mean indices for the boys' left feet is from .24 to .38. The mean index of boys' left feet for all age groups is .33. The range in mean indices for the girls' right feet is from .22 to .38. The mean index of the girls' feet for the various ages is 33. The range in mean indices of the girls' left feet is from .24 to .39. The mean index for all age groups is .34. The ranges and mean indices seem to indicate that there is little difference between the girls' and boys' footprints.

The variation in mean indices at the different age levels is shown in Fig. 3. A study of the curves of both boys' and girls' feet shows that there is no apparent tendency toward flat-footedness with increasing age as measured by the mean footprint index. The curves for the girls' right and left feet show the lowest mean index at six years of age. The low mean index at age six may be due to the presence of a fat pad in some children. This is substantiated by the fact that the presence

of a fat pad occurred so frequently among a number of footprints taken on children four and five years of age that a true measure of the index could not be secured. Consequently, the indices for the children four and five years of age were not included in this study. Usually this fat pad disappears near the age of six. From a study of the curves in Fig. 3 the fat pad apparently disappears at a slightly earlier age among boys. However, there seems to be no significant difference between the variation in mean indices among girls and boys ranging in ages from six to eighteen years.

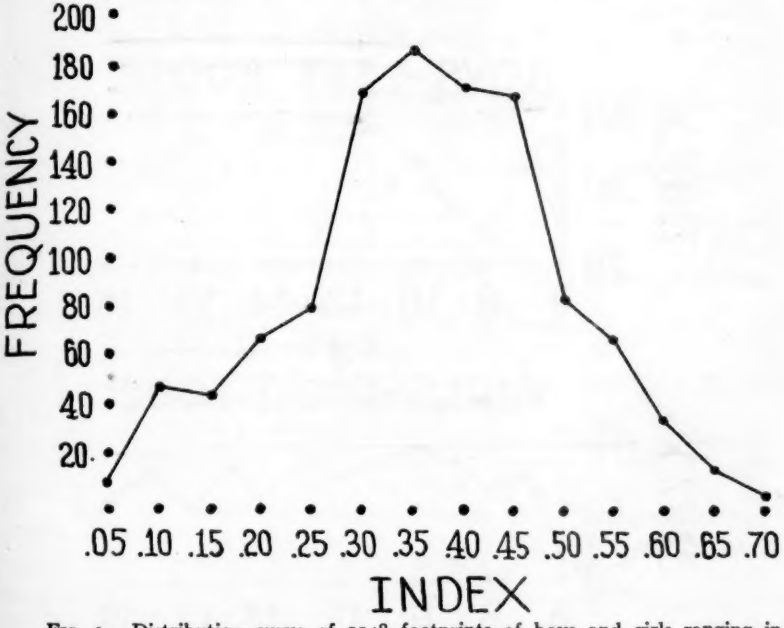

FIG. 2. Distribution curve of 1148 footprints of boys and girls ranging in age from six to eighteen years.

Table II shows that 8 per cent of the 323 boys' right feet and 10 per cent of their left feet had double-contact areas. Table III shows that 17 per cent of the 353 girls' right feet and 22 per cent of their left feet had double-contact areas. These double-contact areas may occur at any age level although there seems to be a slight tendency for them to increase in number in the upper age levels among the girls and to a slight decrease in number in the upper age levels among the boys. The higher percentage of double-contact areas found in the girls' footprints seems to indicate that extremely high arches are more prevalent among the girls. However, this applies only to the upper extreme for it has been pointed out previously that little difference existed in the mean footprint indices for the right and left feet of boys and girls.

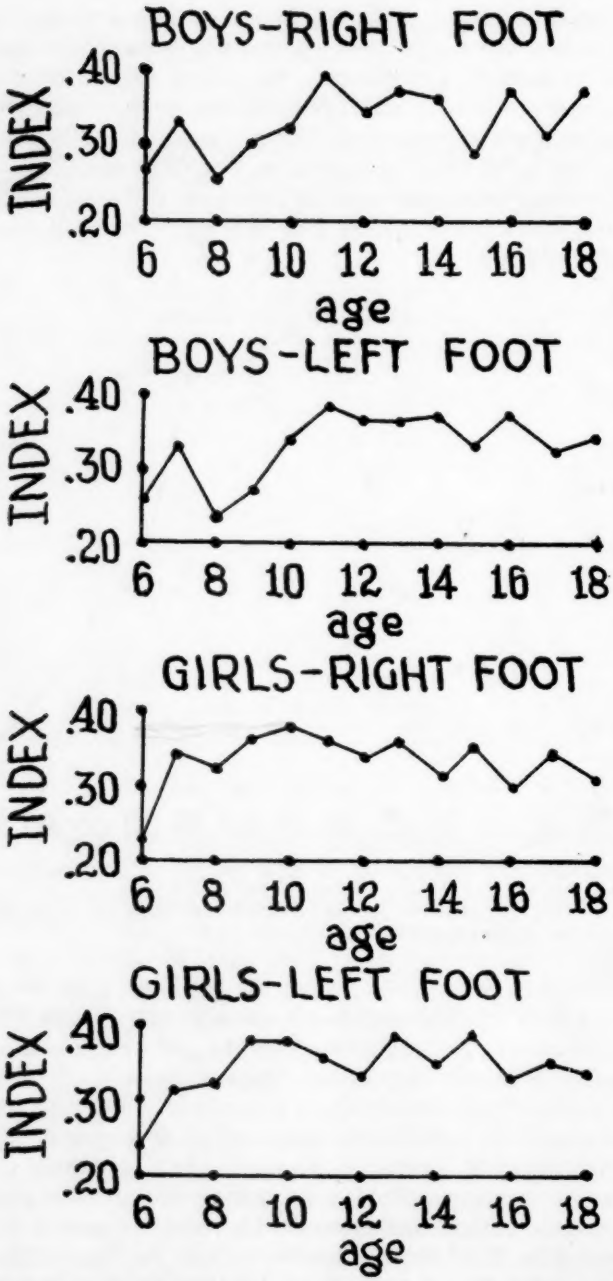

FIG. 3. Curves showing the mean footprint indices at different age levels.

SUMMARY AND CONCLUSIONS

The purpose of this study is to trace the tendency toward flat-footedness as shown by footprints among children of school age. The footprints were taken with a pedograph machine. A line was drawn on the medial border of each print to complete the boundary of the non-contact area. The inked part of the print formed the contact area. The contact and non-contact areas were measured with a planimeter. The footprint index was determined by dividing the non-contact by the contact area. Indices were not determined for footprints having double-contact areas. The results of double-contact area prints were shown by percentages.

From the results of data secured from 676 elementary and high school pupils the following conclusions were drawn:

1. The indices of footprints show that the height of arches in school children approximates a normal distribution.

2. The mean indices of footprints of school children do not reveal a progressive tendency toward flat-footedness with increasing age; that is, no significant difference seems to exist between the mean indices of the upper and lower age levels.

3. A reliable footprint index for purposes of comparison cannot be secured on children below six years of age.

4. There seems to be a tendency for the fat pad, which is found in young children, to disappear at a slightly earlier age among boys.

5. There is a higher percentage of double-contact area footprints among the girls. This indicates that there is a higher percentage of extremely high arches among the girls. However, there is no significant difference in the height of girls' and boys' arches among those on which the footprint index was determined. Only 204 footprints out of 1352 had double-contact areas.

6. The mean footprint indices at the different age levels may be used as norms although it is not advised as normal arches in children range from extremely low to extremely high. It is necessary then that each foot be recognized individually rather than attempt to apply norms.

7. There is but little difference in the mean footprint indices of the right and left feet of children when considering groups. However, there may be a wide difference in the height of arches in the right and left feet of the individual.

8. If the degree of flat-footedness is to be reported in physical examinations of school children, the method described in this paper would be superior to the subjective rating frequently used.

Testing in Physical Education

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ANTHROPOMETRY has been used in relation with physical education since the days of Greece, where the youths were trained to withstand the fatigue of the long march in heavy armor, and to wield with tireless skill the spear, the sword, and the shield. A statue was constructed called the Doryphoros, or Spear Thrower, picturing the perfect man as a broad-shouldered, thick-set, and square-chested individual.

As the arts of civilization became more gentle, the desire for a more slender type became greater. The scenes of the palaestra replaced the fields of war. It was grace rather than strength that began to appeal to the Greek. This change indicated a passing from the pioneer struggle for national existence, in which brute force was dominant, to the keener and more intellectual conflict of a closer community life.

However, it has been only within recent years that the subject of bodily proportions has been approached from the standpoint of the anthropologist rather than the artist, with the object of determining the relationship between body form and function, rather than the design of the human figure which may be portrayed most esthetically. (In the tests discussed below, only those in the American literature have been covered.)

ANTHROPOMETRICAL TESTS

In the field of pure anthropometry, studies have been made of the relation of various measures of the body to one another, resulting in formulation of norms, such as the Wood-Baldwin weight-height table. As a result of clinical studies, Emerson found that "the most significant single measurement in the matter of growth is the relationship existing between physical fitness and the weight-height index," and that the most important single test available was the relationship between weight and height.[1]

In the determination of normal weight, the influence of type of build should be taken into account, as

> . . . prescribing weight on the basis of height, alone, omits the imperative consideration of skeletal *thickness;* . . . and fails to indicate whether

The material herein embodied relates to testing (men) on the college level.

[1] W. R. P. Emerson, "Physical Fitness and Physical Education," *American Physical Education Review,* XXX (Sept., 1925), pp. 375–378.

. . . it is a thin frame excessively flesh-covered, or a thick frame insufficiently flesh-covered; the *average* aspect of physical development (which the height-weight tables represent) has yet to be proved to be the ideal.[2]

The type of build of an individual is taken into consideration in weight prediction by Franzen in his excellent study, "Physical Measures of Growth and Nutrition." Franzen's study was of children. His general procedure and technique were followed by Quimby,[3] who made a study of college men, and Boillin, who made a study of college women.[4]

An age-height-weight table, showing not only the average weight for a given inch of height at a given age, but also how that weight varies, is given in a study by Cozens.[5]

Allen further questioned the relation of height and weight as a "screen" for the determination of nutritional status, i.e., underweight, overweight, etc.[6] He feels that there is an urgent need for a "reliable and practical method for screening out college students whose anthropometric measurements deviate radically from the average of the bodily measurements of the majority of students of comparable age and development." Extreme deviations in individual measurements may be indicators of pathological or structural deficiencies.

As a result of his study of college men (18 years of age), he has formulated a prediction equation for weight based on a combination of anthropometric traits which include chest and biceps girth, and hip width, in the following combination:

Predicted Weight = 1.203 Chest Girth Expanded (in inches) + 1.168 Biceps Girth Contracted (in inches) + 2.654 Hip Width (in centimeters) — 19.006.

"Any anthropometrical study of types shows that any measurement that is correlated with type of stature is distributed on the lines of a normal probability curve."[7] It was with this idea that Hitchcock and Phillips at Amherst, Sargent at Harvard, Seaver at Yale, Hastings at Springfield, and others took anthropometric measurements to determine how the physical development of a given individual compared with the average physical development of the group to which he belonged. "The application of anthropometry to practical work in the gymnasium is

[2] D. P. Willoughby, "An Anthropometric Method for Arriving at the Optimal Proportions of the Body in Any Adult Individual," THE RESEARCH QUARTERLY, III (March, 1932), pp. 48–49.

[3] Rexford C. Quimby, "What a Man Should Weigh," THE RESEARCH QUARTERLY, V (March, 1934), pp. 91–109.

[4] Mary L. Boillin, *Interrelations of Anthropometric Measurements of College Women*, (New York: Bureau of Publications, Teachers College, Columbia University, 1930).

[5] F. W. Cozens, "An Age-Height-Weight Table for Entering College Men," THE RESEARCH QUARTERLY, II (Dec., 1931), pp. 80–83.

[6] R. L. Allen, "Weight Deviation and Health in a College Group," THE RESEARCH QUARTERLY, VII (Oct., 1936), pp. 89–98.

[7] C. H. McCloy, "Weight Standards for the Individual," *American Physical Education Review*, XXXI (Sept., 1926), p. 919.

founded on two fundamental assumptions: first, that the average measurement represents the ideal type; and secondly, that small variations from the type may be considered as physiological variations.[8]

As a result of measuring men for almost half a century, Sargent found that "all the height measurements for college men with which I am familiar show a more or less decided increase during the past thirty or forty years."[9] The following table is taken from Sargent:—

TABLE I
STATURE OF COLLEGE MEN

Year	Subjects	Height in Inches
1861–64	124 Harvard Students	68.601
	167 Yale Students	67.726
	U. S. Recruits in Civil War	67.700
1873–75	Bowdoin	69.974
1880	1000 Harvard Students	67.700
1893	Several Thousand Harvard Students	68.250
1906	1000 Harvard Students	68.750
	835 Athletes	69.500
	325 Scholarship Men	67.700

In 1904, Phillips claimed that the college man was one inch taller and three pounds heavier than the man of the preceding generation or decade. "The increasing popularity of physical exercise in the past quarter century doubtless plays an important rôle in these increments of weight and height."[10] This conclusion was based on the examination of 10,316 students at Amherst from 1860 to 1903.

STRENGTH TESTS

A shift of the emphasis from anthropometric measurements to the measurement of the actual work of an individual may be noted in the strength test developed by Sargent. In 1880, the strength test was introduced at Harvard University in connection with the physical examinations. As a result of ten years' experience, he had come to the conclusion that body size and measurement of muscles alone did not furnish sufficient data upon which to base a judgment of a man's physical power and working capacity. The weighing scales and tape measure do not discriminate between fat and muscle. "There is in the composition of many individuals an unknown equation that makes for strength which can only be brought out by an actual test or trial."[11]

[8] F. Boas, "Statistical Study of Anthropometry," *American Physical Education Review*, VI (June, 1901), p. 174.

[9] D. A. Sargent, "Taking Account of Stock," *American Physical Education Review*, XXVII (Feb., 1922), p. 48.

[10] P. C. Phillips, "Is the Physique of the American College Man and Woman Degenerating?" *American Physical Education Review*, IX (June, 1904), pp. 126–127.

[11] D. A. Sargent, "Strength Tests and the Strong Men of Harvard," *American Physical Education Review*, II (June, 1897), p. 108.

The strength test formulated by Sargent was ratified by fifteen colleges and universities.[12]

Test	*Score*
1. Number of kilograms lifted with back bent	
2. Number of kilograms lifted with legs bent	
3. Number of kilograms gripped—right plus left hand	
4. Dips plus pull-ups times 1/10 of weight	
5. 1/20 of lung capacity (wet spirometer)	——
Total Strength	

(Note: Time limit, 15 minutes)

Sargent set certain limits or standards which candidates for various teams should meet before being allowed to compete:—

Team	*Score*
Crew, football, weight throwers	700
Baseball and track	600
Class crew and football	600
Gymnastics and wrestling	600
Lacrosse, cricket, tennis, class baseball and track	500

In a study of athletes and non-athletes, Wieneke used some of the elements of the Sargent test:[13]

Strength of left and right grip.....manuometer
Back and leg strength .....dynamometer
Vital (lung) capacity .....spirometer

In comparing the athlete and the non-athlete, a member of the athletic group was paired with a member of the non-athletic group who had attained the same score in the above tests given in the fall term. The subjects were measured again in the spring, and the amounts of gain for each of the pair were compared, the difference between the athlete and non-athlete being thus determined.

The conclusions arrived at were as follows:

a) The athletes excelled the non-athletes, approximately 98 out of 100 cases favoring the athletes in grip, back, and leg strength.

b) In comparison of lung capacity, the results were not significantly in favor of the athlete; only 63 cases out of 100 favored the athletes.

c) In general, participation in athletics seemed to be related to certain physical developments not found in non-participants.

Another study, wherein some of the elements of the Sargent test were used, was that of Wendler.[14] He tested 474 men and women for

[12] Report of Committee, "Intercollegiate Strength Tests," *American Physical Education Review*, II (Dec., 1897), pp. 216–220.

[13] K. Wieneke, "A Comparison of Certain Physical Developments of Freshmen Athletes and Non-Athletes," THE RESEARCH QUARTERLY, III (May, 1932), pp. 223–235.

[14] A. J. Wendler, "An Analytical Study of Strength Tests Using the Universal Dynamometer," SUPPLEMENT TO THE RESEARCH QUARTERLY, VI (Oct., 1935) pp. 81–85.

strengths of 47 different muscle groups and formulated a criterion. Of these measures, 21 were selected for analysis on the basis of major importance in physical education activities. On the basis of multiple regression equations, the combination of thigh flexors, leg extensors, arm flexors, and pectoralis major was selected as having the highest correlation with the criterion (total strength). A correlation of .933 was secured (with total strength) as against a correlation of .950 for a combination of the 9 major muscle groups tested by the Intercollegiate Strength Test. Further research is being conducted to standardize measurement techniques and to establish the validity of this battery.

ATHLETIC ABILITY AND ACHIEVEMENT TESTS

Interest shifted from strength tests to the ability to handle the body in running, jumping, climbing, and throwing. What was wanted was a test in which strength should be a minor factor and speed and endurance of major importance.

In 1901 such a test, consisting of six simple exercises, was devised by Sargent.[15] The exercises chosen were the touching of the elbows to the knees from a supine position; the pulling up of part of the body weight; the pushing up of part of the body weight; bending forward and touching the fingers to the floor; rising on the toes; and sitting on the heels and returning to a standing position.

These exercises were continued for a period of thirty minutes without rest, and those successfully completing them were considered to be physically efficient.

Meylan of Columbia is credited with developing a comprehensive test in 1905, utilizing the elements of running, jumping, vaulting, climbing, and swimming.[16] The test is based on three factors: The first factor, that of health, was determined by the individual's physical condition, and the intercollegiate strength test. The second, vitality, was determined by the ability of an individual to jump and grasp two vertical ropes, with a maximum of 120 jumps. The third factor, that of bodily control, was determined by four apparatus tests.

Changes in the above test were reported by Meylan in 1913. Swimming and a knowledge of exercise, games, and the principles of hygiene were added. Standards of proficiency were set up for freshmen and sophomores. Meylan divided the men taking physical education into three groups.

In group A were the men whose records in all the tests were excellent. These men were allowed to enroll in any of the university sports. In group B were the men who had a good average record, but had to

[15] D. A. Sargent, "Twenty Years' Progress in Proficiency Tests," *American Physical Education Review*, XVII (Oct., 1913), p. 455.

[16] John F. Bovard and Frederick W. Cozens, *Tests and Measurements in Physical Education*, pp. 110–113.

enroll in one of the regular physical education sections. In group C were the men who needed special work and registered in special sections. Students had to score forty points in the test given below to qualify in group A.[17]

Event	*10 Points*	*8 Points*
One lap run (176 yards)	22 seconds	22-1/5 seconds
Running high jump	4 feet 6 inches	4 feet 2 inches
Bar vault	5 feet 6 inches	5 feet 0 inches
Rope climb	20 feet and cross	20 feet and return
Swimming	Strokes, distance, and life saving.	
	50	40

In order to stimulate interest in all-round athletic ability, a national athletic fraternity known as Sigma Delta Psi, containing twelve well-known tests, was started at the University of Indiana in 1912.[18]

The physical education program at the University of California is based upon three practical factors.[19] First of all, a student has to be capable of moving quickly, accurately and effectively in case of accident. To test a man's agility in muscular coordination of this practical sort an agility test was established, utilizing five events, namely, running, jumping, fence-vaulting, climbing, and falling. Secondly, the student is required to be able to defend himself against physical aggression. A knowledge of some form of self-defense gained under proper guidance would develop a valuable type of self-control, as well as a confidence which could be counted upon to afford weaker dependents assurance and protection. The program of self-defense includes boxing, wrestling, and fencing. Finally, the student must show himself capable of meeting an emergency demanding skill in swimming, and a knowledge of the art of rescuing individuals in danger of drowning. Accordingly, swimming, diving, and lifesaving must be mastered.

The men are classified as a result of the tests as A, B, C, D, or E, depending upon the scores obtained. These grades have been set up on the basis of tests given to 500 freshmen. Each letter represents one standard deviation of the scale (7-24-38-24-7). Thus, through the use of the standard deviation, the grades in each event are rendered comparable.

Anyone failing to pass any phase of the efficiency test is assigned to a form of physical training calculated to correct his particular deficiencies and round out the development of the individual's physical mechanism. As soon as a man shows sufficient ability to pass all tests,

[17] *Ibid.*, p. 113.

[18] *Ibid.*, pp. 113–114.

[19] F. Kleeberger, "Physical Efficiency as Measured at the University of California," THE RESEARCH QUARTERLY, III (May, 1932), pp. 154–164.

he proceeds from the novice to the athletic division and thereafter selects the sports which especially interest him.

Other tests of athletic ability and achievement used for purposes of classification and stimulation of interest are the University of Oregon Physical Ability Pentathlon, the University of California at Los Angeles Tests, Schuettner's Scheme of Stimulating Interest (University of Illinois), the Ohio State University Efficiency Test, Metcalf's Standards Proposed to the College Directors' Society, the National Amateur Athletic Federation Physical Efficiency Standards, and the College Freshmen Physical Efficiency Test of the National Collegiate Athletic Association.[20]

Metcalf found that with Oberlin students, the correlation between ability to run, jump, vault, and climb, and membership on varsity or interclass athletic teams was .65 and that the relationship between height and ability to high jump was .24; between height and bar vault, .19; between weight and ability to run 184 yards, .16; and between weight and ability to chin the high bar, —.23. He came to the conclusion that a man who does not rank in the upper 40 per cent in such an efficiency test has practically no chance of making a varsity team.[21]

Cozens formulated a battery of tests to measure the general athletic ability of college men.[22] His battery of tests serves as an index for classifying students physically as superior, above average, average, below average, and inferior. In another study, Cozens found that height and weight are apparently influencing factors to some extent in the matter of performance, although the correlations are not sufficiently high to be used in predicting performance.[23] Cozens found a correlation of .297 between height and high jumping, and of .159 between weight and high jumping.

INDICES FOR MEASURING PHYSICAL EFFICIENCY

It is difficult to obtain quickly a summary of one's standing by means of the tests mentioned previously. To overcome this difficulty the index was developed, which attempts to show in a single figure how near to some standard or norm each student has arrived.

Sargent points out that a man's strength is supposed to increase with his height and weight.[24] These measures are insufficient as an indication of a man's physical power. He suggests that to mere height

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20 Bovard and Cozens, *op. cit.*, pp. 117–123.

21 T. N. Metcalf, "Standards and Tests in Physical Education," *American Physical Education Review*, XXVII (Sept., 1922), pp. 323–326.

22 Frederick W. Cozens, *The Measurement of General Athletic Ability in College Men*, p. 177.

23 F. W. Cozens, "A Study of Stature in Relation to Physical Performance," THE RESEARCH QUARTERLY, I (March, 1930), p. 39.

24 D. A. Sargent, "The Physical Test of a Man," *American Physical Education Review*," XXVI (April, 1921), pp. 189–194.

and weight be added the ability to overcome gravity. He constructed the following formula:

$$\text{Efficiency Index} = \frac{\text{Weight} \times \text{Height Jumped}}{\text{Height}}$$

This he offered as a valid "test of a man," claiming that the test measured strength, speed, energy, and skill or dexterity. *Strength* is required to project one's weight into the air against the force of gravity. Effort will have to be made with a certain amount of *speed* or velocity to create impetus to carry the body above its standing height. *Energy* is needed to drive the internal machinery, and *skill* or *dexterity* is involved in the execution of the jump.

The test consisted of a single jump into the air as high as possible. The difference between the height reached by the top of the head and the standing height was taken as the record of the jump.

In a later study (1924), L. W. Sargent found no significant relationships between the D. A. Sargent jump and height and weight.[25] He found a correlation of .39 between the D. A. Sargent test and age, though it was evident that this relationship did not exist above seventeen years of age.

A variation of the Sargent test was reported by Schwegler and Engelhardt in 1924. In place of the single jump, the test obtained the sum of a series of jumps in the air, executed as rapidly as possible over a specified length of time, namely, fifteen seconds. The subject was required to stay within a two-foot circle while jumping. This brought into consideration, besides the height of the jump, the additional factors of speed and endurance.[26] The index used was:

$$\text{Index} = \frac{\text{Sum of Jumps} \times \text{Square Root of Weight}}{\text{Height}}$$

Bovard and Cozens made an investigation into the possibilities of the Sargent test (best single jump) and the Schwegler-Englehardt test (sum of jumps in fifteen seconds) as measures of general athletic ability.[27] The criterion selected for general athletic ability consisted of a group of four athletic ability tests (dash, high jump, rope climb, and bar vault). Two groups of men were studied: physical ability men (those passing a physical ability test and electing an activity other than regular classwork), and non-physical ability men (those taking class work due to failure in the physical ability test which was used for classification at the beginning of the semester).

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[25] L. W. Sargent, "Some Observations of the Sargent Test of Neuro-Muscular Efficiency," *American Physical Education Review*, XXIX (Feb., 1924), pp. 47–56.

[26] R. A. Schwegler and J. L. Engelhardt, "A Test of Physical Efficiency," *American Physical Education Review*, XXIX (Nov., 1924), pp. 501–505.

[27] John F. Bovard and Frederick W. Cozens, *The Leap-Meter*.

The investigators found that the athletes did not vary over so wide a range of measurements as did the unfit. Some of "the unfit often rated as high as the athletes, while on the contrary the athletes never rated as low as the unfit."[28]

TABLE II
COMPARISON OF PHYSICAL ABILITY MEN AND NON-PHYSICAL ABILITY MEN

Item	Physical Ability Men	Non-Physical Ability Men
Number of Cases	77	77
Range—Total Number of Inches Jumped	108–212½	72½–228½
Mean	161.05	151.92
Standard Deviation	24.5	35.03
Range—Best Single Jump	14½–22½	13½–21½
Mean	18.117	17.07
Standard Deviation	1.965	2.025

Bovard and Cozens felt that justification for the use of the factors of height and weight in the Schwegler-Engelhardt test and in the Sargent test was lacking. This conclusion was based upon the results shown in Table III.[29]

TABLE III
CORRELATION BETWEEN VARIOUS EVENTS AND TOTAL NUMBER OF INCHES JUMPED

	Physical Ability Group		Non-Physical Ability Group	
	Total No. of Inches Jumped	Best Jump	Total No. of Inches Jumped	Best Jump
Height	—.017	—.097	—.220	—.009
Weight	.074	.050	—.025	—.107
High Jump	.198	.178	.138	.459
Rope Climb	.318	—.053	—.095	.274
Two-lap Run (196 yds)	.216	.165	.130	.328
Bar Vault	.087	.174	.142	.246
Best Jump*	.43	....	.642	....

* This indicates the possibility of a fairly close relationship between the two types of jumps if the group should become strictly non-homogeneous. Also, with unskilled groups, best jump is a better indicator of fundamental bodily skills than total jumps.

McCloy correlated the Sargent jump (with the individual standing in the center of an eighteen-inch circle) against certain athletic activities: the 100-yard dash, running high jump, standing broad-jump, and eight-pound shot-put.[30] A "classification index" was used: 20 × (Age in years) + 6 × (Height in inches) + (Weight in pounds). Age is not added beyond seventeen.[31]

[28] *Ibid.*, p. 107.
[29] *Ibid.*, pp. 106–113.
[30] C. H. McCloy, "Recent Studies in the Sargent Jump," THE RESEARCH QUARTERLY, III (May, 1932), pp. 237–238.
[31] Charles H. McCloy, *The Measurement of Athletic Power.*

Of the studies made by McCloy, only one applied to college students. This study was made on a group of twenty-six Chinese physical education majors and the following results were obtained:[32]

Correlation of track and field events with Sargent jump	.752
Correlation of track and field events with height	.665
Correlation of track and field events with weight	.733
Multiple correlation of track and field events with Sargent jump, height and weight	.890
Multiple correlation of track and field events with Sargent jump and weight	.888

As a result, McCloy recommended that the Sargent jump be weighted. His formula for this procedure was,

$$25 \times (\text{Sargent jump in inches}) - (\text{Classification Index}).$$[33]

A "Physical Fitness Index" was developed by F. R. Rogers.[34] This was the achieved strength index of an individual divided by the normal strength index for the individual's age and weight. The strength index is obtained from:

a) Lung capacity
b) Right and left hand grip
c) Back lift
d) Leg lift
e) Arm strength:

$$\text{Pull-ups} + \text{push-ups} \times \frac{\text{Weight}}{10} + (\text{Height} - 60)$$

f) Add the scores above, the total is the Strength Index.

$$\text{Fitness Index} = \frac{\text{Actual Strength Index}}{\text{Normal Strength Index}}$$

Rogers' test was based on data secured from high school students. A modification of this test was used on college students.[35] It was found that the norms established by Rogers were wholly inadequate for men on the college level. Members of the varsity athletic teams were given the physical fitness test and no definite relationship could be established between athletic ability and physical fitness. On the basis of his study of 515 cases, G. N. Messer established a series of new norms for different classifications by weight.[35] Based on the new norms, a relationship of .889 was obtained between physical fitness and strength index, and of .92 between strength index and athletic ability. In the freshman

[32] McCloy, *op. cit.*, p. 239.
[33] *Ibid.*, p. 242.
[34] Frederick R. Rogers, *Physical Capacity Tests in the Administration of Physical Education*, pp. 67–68.
[35] Guerdon N. Messer, *Critical Analysis of the Application of the Rogers' Physical Fitness Test to Williams College Students*, Ph.D. Thesis, School of Education, New York University, 1932, pp. 44–55.

group a correlation of .84, and, in the sophomore group, a correlation of .92, was obtained between athletic ability and physical fitness.

In 1931, McCloy proposed a method of scoring chinning and dipping strength that was "more accurate" than that used in either the Intercollegiate Strength Test of Sargent, or the Physical Capacity Test of Rogers.[36]

Other investigators, since 1927, have formulated tests using some of the elements of the Rogers Test. A brief summary is contained in an article by Rogers.[37]

A "static center of gravity test" has been developed at Springfield College, which the investigators claim is definitely related to posture, strength, physical fitness, and athletic ability.[38] They found the following relationships between the "center of gravity test" and:

Body Lean (correct posture)	.864
Rogers Strength Test	.506
Rogers Physical Fitness Index	.750
Endurance (McCurdy-Larson Test)	.060
Body Build (Davenport's Index)	.090
Athletic Ability (Sargent Jump)	.490

TRACK AND FIELD ATHLETICS

In the realm of track and field athletics, various methods for constructing scoring tables and classification for competition have been suggested. It has been suggested by Brace[39] and McCloy[40] (among others) that scoring tables be based on the normal probability curve, and that they utilize the so-called "T" scores. Difficulty in one event should correspond in difficulty with other events. Many methods have been suggested for classification in competition; the factors considered (in different combinations) are age, height, and weight.

An investigation was made by Westerlund and Tuttle to determine whether there was any difference between the reaction time of those running the short distances and those who specialize in the distance events, and also to see if there was any relationship between speed in running and reaction time.[41] The results obtained were as follows:

[36] C. H. McCloy, "A New Method of Scoring Chinning and Dipping," THE RESEARCH QUARTERLY, II (Dec., 1931), pp. 132–143.

[37] F. R. Rogers, "A Review of Recent Strength Testing Literature," *The Journal of Health and Physical Education*, V (March, 1934), pp. 8–10.

[38] T. K. Cureton and J. S. Wickens, "The Center of Gravity of the Human Body in the Antero-Posterior Plane and Its Relation to Posture, Physical Fitness, and Athletic Ability," SUPPLEMENT TO THE RESEARCH QUARTERLY, VI (May, 1935), pp. 93–105.

[39] D. K. Brace, "A Method for Constructing Athletic Scoring Tables," *American Physical Education Review*, XXIX (April, 1924), pp. 155–158.

[40] C. H. McCloy, "A Statistical and Mathematical Method of Devising Athletic Scoring Tables," *American Physical Education Review*, XXVI (Jan., 1921), pp. 1–3.

[41] J. H. Westerlund and W. W. Tuttle, "Relationship Between Running Events in Track and Reaction Time," THE RESEARCH QUARTERLY, II (Oct., 1931), pp. 95–97.

Short distance men	.131 mean reaction time
Middle distance men	.149 mean reaction time
Long distance men	.169 mean reaction time

The correlation between reaction time and speed was .863, speed being determined by the best time made by an individual, in three trials, in the 75-yard dash.

A parallel study was made to determine the relationship between reflex time and running events in track.[42] The conclusion was reached that there is a direct relationship between the reflex times of sprinters and the distance of the race for which they are specially trained. The short distance men have the shortest reflex time, .0965 seconds, and the distance men the longest, .1345 seconds.

The middle distance men, with .1221 seconds, fall between these two.

It was also found that there is a high degree of relationship between reflex time and speed in sprinting, the coefficient of correlation being .815.

Various views have been expressed as to what type of physical stature best suits an individual for a particular event in the track and field program. Some of these views are outcomes of studies that have been made, and others are the result of the practical experience of track coaches, and not of scientific procedures. Schmidt and Sputh classify individuals under three heads.[43] One group they characterize as the asthenic type. Members of this group are slender, tall, narrow-shouldered, and flat-chested, and have moderately developed musculature. This type does not mark the weakling, for asthenics frequently are capable of achieving records, especially in jumping. The second, the pyknic type, is composed of short and stocky individuals, having a vigorous development of the abdominal region. The third division is the muscular or athletic type. Individuals of this group are well-proportioned and have a structure suited for definite types of activity. "It is remarkable that the prominent representatives of the different sports have a definite build (physique) fitted or suited for their respective sport. This may have been developed in practicing for the sport but it may be hereditary."[44]

The preference for a particular sport is governed by ability, attainment, and mental attitude of the individual. In their examinations and investigations of prominent athletes, Schmidt and Sputh found that every sport requires a definite body build. The high jumper is favored if he does not have to lift a very heavy body. If he has long legs he can almost step over the bar, while a short man needs a good spring to clear the cross bar at a good height.

[42] R. Lautenbach and W. W. Tuttle, "The Relation Between Reflex Time and Running Events in Track," THE RESEARCH QUARTERLY, III (Oct., 1932), pp. 141–142.
[43] Ferdinand A. Schmidt and Carl B. Sputh, *Physiology of Exercise*, pp. 198–201.
[44] *Ibid.*, p. 199.

Another writer believes that "fitness for sport depends partly on anatomical build; partly on physiological stamina, speed and skill; partly on nervous vigor, coordination and tenacity."[45]

Breitinger supports the belief that there is a very probable association between athletic achievement and relative form characteristics of the body. "The various correlations lead to the conviction that the individual characteristics . . . do not indicate a mechanical or physiological significance; rather, the total performance is determined by the physiological age and the constitutional type."[46]

At the 1932 Olympic Games, R. Tait McKenzie was responsible for the statement that, "Athletes run very much to types in the various sports."[47] In the same article, illustrations are given of world's champions. For example, high jumpers are classified as six feet tall or over, and must have coordination, strength, spring, and elasticity.

Athletic accomplishment is dependent upon physical constitution, technique, and the will to achieve. "It is obvious in a few specialized events a particular body build may confer advantages which cannot be overbalanced by any amount of training and determination on the part of the less gifted."[48] Among these are the high jumpers with height serving to advantage, and weight to a disadvantage.

Sargent, in studying the characteristics of different types of athletes, also found that variations in stature or total height, and relative length of trunk and limbs tend to favor different classes of athletic performers. As a rule, the successful jumper is characterized by long legs and a relatively short body. "And so through the whole range of athletic specialists, each gains some mechanical advantage from the development that is peculiar to him."[49] In a study conducted by the writer (and briefly reported in THE RESEARCH QUARTERLY), it was determined that the skeletal characteristics found to be peculiar to the expert high jumpers were long legs, a short body, and broad feet.[50]

In a study comparing five athletes with 2300 college students, between the ages of 16 and 27, Bemies attempted to present some physical differences which the successful track athlete possesses and which are the basis of his superiority. The track athletes consisted of five men who had won championships in eight events. Bemies found that the

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[45] H. Gray, "Body Build in Football Players," THE RESEARCH QUARTERLY, VII (Oct., 1936), pp. 47–57.

[46] E. Breitinger, "Body Form and Athletic Achievement of Youths," THE RESEARCH QUARTERLY, VI (May, 1935), pp. 85–91.

[47] R. Boardman, "World's Champions Run to Types," *The Journal of Health and Physical Education*, IV (May, 1933), pp. 32–33.

[48] W. M. Cobb, "Race and Runners," *The Journal of Health and Physical Education*, VII (Jan., 1936), pp. 3–7.

[49] D. A. Sargent, "A Physical Test of a Man," *American Physical Education Review*, XXVI (April, 1921), p. 189.

[50] H. Krakower, "Skeletal Characteristics of the High Jumper," THE RESEARCH QUARTERLY, VI (May, 1935), pp. 75–84.

jumper was taller than the average in height and had a shorter body and longer legs than the average. He came to the conclusion that the athlete is a type by himself; no trainer can take a student of average proportions and make an intercollegiate winner out of him. The athletic student takes an interest in certain types of athletics because he was born with certain peculiarities of bodily structure that enable him to excel his fellows.[51] How far and where these and other studies will carry us, we do not know, but they lead on to new possibilities.

[51] C. O. Bemies, "Physical Characteristics of the Runner and Jumper," *American Physical Education Review*, V (Sept., 1900), pp. 235–245.

The Status of Intramural Programs for Women

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INTRODUCTION

THE widespread growth of intramural programs for women in colleges and universities has been accompanied by the realization of the values and importance of such programs. Fundamentally, the activities of the intramural program are the logical outgrowth of the instructional program in physical education. Further, the opportunities available through intramurals to engage voluntarily in recreational physical activities should serve as the basis for the development of leisure-time interests.

The administration of a program of intramural activities has become an important phase of the general administration of a departmental program. The problems of organization and supervision that arise during the process of developing an adequate intramural organization place emphasis upon the need for expert and experienced leadership.

Certain of the policies and procedures involved in the administration of intramural programs for women are general throughout the country. It was with the purpose in mind of determining trends in intramural administration that the following study was carried out.

SURVEY OF INTRAMURAL PROGRAMS

This article represents the findings of a study made during the early part of 1936 by the authors in an attempt to ascertain the present status of intramural programs for women. A questionnaire survey was made and further elaborated upon by personal statements on intramural problems secured from outstanding women leaders in the field of physical education.

Questionnaires were sent to ninety-four private and public colleges, universities, and normal schools. Seventy-seven questionnaires were returned.[1]

[1] Percentage of return: 81.92.

Private institutions	47	sent	38 returned
Public institutions	42	sent	36 returned
Professional schools	5	sent	3 returned

Intramural programs are sponsored by seventy-six of the seventy-seven answering the questionnaire.

Units for Participation and Competition.—Intramural activities should offer an opportunity for every woman student to participate in the forms of activity in which she is already interested, to establish new interests, and to engage in activities with various groups. The majority of colleges and universities offer a wide variety of recreational activities, of both competitive and non-competitive nature, and provide for participation in groups organized for social and scholastic purposes, as well as for the primary purpose of athletic activity. The number of institutions offering recreational activity in the intramural program for specified units is as follows:

62—Interclass units
51—Living units (sororities, dormitories, etc.)
21—Clubs
12—Inter-club units
13—Graduate teams
18—Faculty teams
7—Inter-departmental competition
2—Inter-college teams (within the university)
1—Teams within instructional classes
10—Open tournaments
17—Individual participation
7—Mixed recreation (others sponsor it but do not yet include it in their intramural programs)
2—Color teams

The number of units in any one institution for which participation and competition are organized varies from one to seven. Twelve institutions provide for only one type of unit: six interclass, five living units, and one inter-club.

The most frequently occuring combinations in situations where provision is made for more than one unit, and the number of institutions sponsoring more than one division, are as follows:

Seventeen institutions provide for 2 types: interclass and living units.

Twenty institutions provide for 3 types: interclass and living unit with either club, individual, or graduate.

Nineteen institutions provide for 4 types: interclass and living unit with either club, individual, graduate, mixed groups, or faculty.

Five institutions provide for 5 types: interclass and living unit with inter-club, graduate, and faculty groups.

One institution provides for 6 types: interclass, living unit, club, inter-club, inter-department, and faculty.

One institution provides for 7 types: interclass, living unit, inter-club, inter-department, individual, open, and faculty.

Program of Activities.—The number of activities offered in any one college or university ranges from four to thirty, with the majority providing between eight and fifteen activities. In order of frequency of appearance in intramural programs, with indication of the number of institutions sponsoring each activity, the programs of the seventy-six colleges, universities, and normal schools include the following:

74 Basketball
69 Tennis
65 Archery
64 Swimming
63 Baseball
63 Hockey
51 Volleyball
43 Ping-pong
43 Badminton
37 Golf
36 Dancing
- 33 Modern
- 17 Tap-Clog
- 14 Folk

35 Riding
26 Soccer
26 Fencing
21 Shuffleboard
19 Rifle
18 Quoitennis
17 Bowling
16 Horseshoes
15 Track
14 Speedball
14 Paddle Tennis
11 Lacrosse
10 Canoeing
9 Ice Skating
8 Skiing
4 Squash
2 Crew
2 Fist Ball
2 Tumbling
1 Serve-us Ball
1 Handball
1 Hiking
1 Bicycling
1 Aerial Darts
1 Foul Throwing
1 American Ball
57 Telegraphic Meets and Tournaments
- 49 Archery
- 40 Swimming
- 24 Rifle
- 2 Bowling
- 1 Track

Sponsorship of Intramural Programs.—The questionnaire findings indicate that the intramural program is considered a phase of the departmental program, sponsored in conjunction with the Women's Athletic Association. Since the basic reason for the existence of the W.A.A. is founded in the recreational activities of the physical education program, it is logical to assume that that organization should be responsible for certain phases of the development of the intramural program.

Sixty-six colleges and universities indicate joint sponsorship by the Department of Physical Education for Women and the W.A.A.

Five indicate the W.A.A. and the Intramural Board of the W.A.A. as the sponsors.

Four indicate the Department of Physical Education for Women as the sponsor.

One College Athletic Association for men and women sponsors the entire intramural program.

Policies.—The growth of the intramural program for women has progressed through various stages from that of the recreational program sponsored, directed, and financed entirely by students; through that of strictly interclass activities, supported in part by physical education departments; to the present-day program of activities which, in most cases, is sponsored, administered, and financed to a large degree

by the Department of Physical Education for Women. Changes in policy have accompanied the changing emphases in the program. The Women's Athletic Association has been a prominent factor in the promotion of intramural activities. With the enlargement of the program to include units of participation and competition other than class, Intramural Boards have been established in many organizations to carry on the necessary administrative work for the student group in relation to intramural units.

In order to determine the policies followed in the administration of intramural programs, a list was included in the questionnaire which provided an opportunity for indications of policy relative to the Department of Physical Education, the Women's Athletic Association, and the Intramural Board concerning the functions of each in the intramural program. The list and total number of answers for each policy follows:

70—A cooperative function of the Department of Physical Education and the W.A.A.

68—An integral part of the total program of physical education.

16—The W.A.A. specifically concerned with interclass competition.

14—Student relationships with the Intramural Board carried on as an aspect of the W.A.A. program.

13—The Intramural Board primarily concerned with units of competition other than interclass.

2—A specific responsibility of the W.A.A., exclusive of the departmental program.

0—A separate department with a specially selected staff.

Control of Administrative Procedures.—The routine administrative procedures considered were those involving general rules and regulations for participation, eligibility, selection of teams, awarding of points, appointment of managers, disbursement of funds, and record keeping.

The results indicate that by far the greatest number of universities and colleges follow the practice of maintaining cooperative control by the W.A.A. and the Physical Education Department for Women over rules and regulations for participation, eligibility, and selection of teams; whereas the W.A.A. controls the awarding of points, selection of managers, disbursement of W.A.A. and Intramural Board funds, and record keeping. Twenty-seven answers indicated joint control or supervision by the Department of Physical Education for Women over funds of the W.A.A. and the Intramural Board, and over record keeping. While the actual appointment of managers is made by the W.A.A., the practice is general for the W.A.A. to follow the suggestions or recommendations made by the advisers of activities as to the selection of managers.

The required number of practices varies widely according to the type of activity and the season. Fifty-nine schools require practices;

seventeen have no practice requirements; and one did not indicate its policy.

No. Schools Requiring Practices	No. Practices Required
17	0
1	1
2	2
2	3
2	4
1	5
3	6
3	8
1	10
1	$\frac{1}{2}$ of total number
6	$\frac{2}{3}$ of total number
3	$\frac{3}{4}$ of total number
2	$\frac{4}{5}$ of total number
1	2 a week
1	Freshman and sophomore class work for 8 weeks
27	Varies with the activity

Times for Holding Practices and Games.—In most institutions practices and games are carried on during the late afternoon hours or, in some cases, both afternoon and evening.

PRACTICE AND GAME TIMES

Time	Practices	Games
Late afternoon	71	73
Evening	25	36
During school time	9	4
Saturday morning	3	3
Saturday afternoon	1	
Open choice	1	
Noon		2

Delegation of Staff Responsibility for Supervision of Intramurals and W.A.A.—The most frequent combinations indicating the delegation of staff responsibility in carrying on the intramural program, in order of occurrence, were:

Staff member selected to act as the adviser of the W.A.A. and the instructor of each activity acting as adviser for that part of the program only.

Specially assigned intramural supervisor or director, and intramural adviser working in conjunction with the advisers or coaches of specific sports.

Specially assigned intramural supervisor or adviser, and director of the department acting as supervisor or adviser of the W.A.A.

Individual items were checked in the following order:

43—Instructor of each activity acts as adviser for that part of the program only.

37—Director of the department acts as supervisor or adviser of the W.A.A.

36—Staff member selected to act as the adviser of the W.A.A.

21—Specially assigned intramural supervisor or director.

21—Intramural adviser works in conjunction with the advisers or coaches of specific sports.

15—Director of the department acts as supervisor or adviser of the intramural program.

12—Staff member, other than the W.A.A. adviser, selected to act as the adviser of the Intramural Board.

9—Selection of faculty advisers made by the W.A.A. or Intramural Board.

Finances.—The problems of financing an intramural program are not entirely confined to the expense involved in the use of staff time, the upkeep of facilities, and the expenditures for additional equipment for participating groups. The necessity for adequate financial support for intramural programs and the operating expenses of women's athletic associations has produced definite problems concerned with means of raising money.

In order to supplement finances, women's campus organizations have agitated for a percentage of the student body fees to carry on their activities. Both men and women in most coeducational colleges and universities pay student body fees, the balance of which is diverted to men's athletics. The proportionate amounts prorated for women's intramural athletics and men's intramural athletics is, almost invariably, largely in favor of men's intramurals. Nevertheless, the questionnaire results indicate that, in the majority of institutions, a budget is provided from the general student body fees for the W.A.A. or the intramural program.

In the case of inadequate budget apportionment for the operating expenses of the W.A.A., or in order to supply the equipment for intramural activities not provided for through the departmental or student body budget, various methods are employed to raise additional money for the support of the program and the W.A.A.

The definite expression of disapproval by women leaders in physical education of charging gate receipts for women's athletic events, and the detrimental effects of limiting participation when entrance fees are charged of participants, or participating groups, has apparently stimulated the adoption of a wide variety of methods for raising money other than those made available through the activities of the intramural program.

This trend is shown by the comparison of practices followed as indicated by the questionnaire findings.

Gate Receipts

Seventy-two institutions do not charge gate receipts at intramural events.

Five institutions charge admission to intramural events:

Two charge 10c at each intramural game.
One charges 10c at semifinals and finals.
One charges 10c at finals.
One charges 5c at preliminary swimming meets.
One charges 10c at semifinals and finals.

Entrance Fees

Sixty-seven institutions do not charge any entrance fee for participating individuals or groups in any intramural activities.

Ten institutions maintain some sort of entrance fee:

Three charge each individual participant:
- One charges 25c each semester
- One charges 25c each semester in the form of an Athletic Association ticket
- One charges 10c each quarter for each individual participant

Two charge for class participation:
- One did not state a definite amount
- One charges $1.00 membership dues in the W.A.A. before the individual may participate on a class team

Four charge each living unit an annual fee:
- One charges 50c for each group other than class
- One charges $1.00 for each sorority
- One charges $2.50 for each sorority, living unit, and independent group
- One charges $6.00 for each sorority

One charges a fee for a specific activity:
- One charges $5.00 for each group for bowling.

Special Events to Raise Money

Twenty-eight institutions sponsor special events to raise money.

Forty-nine institutions do not sponsor such events; the majority indicated that they receive a sufficient budget from the student body funds or from the Physical Education Department for Women so that there is no necessity to further augment their budgets.

Special events or methods used to raise money:

1. Entertainments: cabarets, circuses, carnivals, vaudeville shows, minstrel shows, sports movies, swimming pageants, programs and recitals, demonstrations, May festivals, amateur nights, concerts, social dances, skating parties, fashion teas, hay rides, sleigh rides.

2. Sales: Candy, fruit, sandwiches, food, flowers, rummage sales, chances on sport equipment, luncheons, strawberry festivals, tag sales.

3. Concessions: percentage on gymnasium costumes sold, concessions at intercollegiate games, checking concessions at various social functions.
4. Percentage of gate receipts from intercollegiate contests.
5. Membership drives.

Source of Financial Support.—Sixty-three of the seventy-seven questionnaires returned indicated financial apportionment from various sources for all or part of the expenses listed; fifty-one of the sixty-three indicated for all items; and fourteen did not indicate.

The financial study included the percentage of financial support furnished by the physical education department, the athletic association, student body fees, and other sources, for the expenses involved for instruction, equipment, facilities, awards, and other expenses of the intramural program.

The questionnaire findings relative to intramural expense and the percentage of financial support furnished by each source indicate that in the majority of colleges and universities the Department of Physical Education for Women furnishes the budget for instruction, equipment, and facilities; and the athletic association budget, prorated from student body fees, supports a small per cent of the cost of equipment, and finances awards and general expenses of the association program. In a few cases the departmental budget provided for all of the expenses of the intramural program and the athletic association.

The sources of income for the athletic association budget were indicated as follows:

Forty-one associations receive budgets prorated from student body fees.
Fifteen budget sources for associations were not indicated.
Five associations raise all of their own money.
Two associations are supported entirely by the physical education department.

The amounts of the budgets received from student body fees vary from $10.00 a year to $2500 a year.

Extramural Competition.—While very few colleges or universities sponsor an inter-collegiate program of competitive athletics for women, the majority of those answering the questionnaire sponsor one or more types of extramural competition.

Seventy-three institutions allow extramural competition in some form.
Four institutions have no program of extramurals.

Types sponsored, and number sponsoring each type:

57—Some form of telegraphic meet or tournament.
54—Playdays with mixed teams.
49—Telegraphic archery tournaments.
40—Telegraphic swimming meets.

Intramural Expense Apportionment

Showing the percentage furnished by each source for each item, and the number of places furnishing each percentage. Financial support furnished by the W.A.A. budget prorated from student fees is indicated under Student Body.

Item	Per Cent	P.E. Dept.	W.A.A.	Intra-mural Board	Student Body	Athletic Council
Instruction	100	59				1
	99	1				
	90	2				
	75	1				
	25				1	
	10				1	
	1				1	
Equipment	100	28	1		8	1
	99.75	1				
	95	6				
	90	3	1			
	80	1				
	75	2			1	
	50	5			5	
	25	1	1		1	
	20		1			
	10	1	1		1	
	5		1	1	4	
	.25		1			
Facilities	100	52				1
	95	2				
	90	1				
	80	2				
	75	1				
	25				1	
	20		1	1	1	
	10				1	
	5				2	
Awards	100	6	18	1	29	1
	95				1	
	75		1			
	50	2			3	
	25		2	2	1	
	5	1				
Other Expenses	100	5	9	1	17	1
	95	1				
	75		1		1	
	50	1	2		2	
	25		1	1	2	
	5				1	

32—Sports days with teams representing their own institutions in team and individual sports.
24—Telegraphic rifle meets.
14—Interclass-intercollegiate competition.
13—Intercollegiate varsity competition.
7—Intercollegiate club competition.
5—Sports days with teams representing their own institutions in team games only.
3—Sports days with teams representing their own institutions in individual sports only.
2—Telegraphic bowling meets.
2—Competition with sports clubs other than those composed of college students.
1—Telegraphic track meet.
1—State tournaments in archery, golf, and tennis.
1—Games with men's colleges in golf, tennis, and field hockey.

Hindrances to More Adequate Programs.—A check list was included in the questionnaire to ascertain the principal factors that intramural leaders feel prevent the development of more complete programs of activities, and more general participation. Tabulation of the answers shows that the following conditions are most prevalent as drawbacks in order of frequency as indicated by the numbers checking each.

42—General schedule of late afternoon classes throughout the institution.
39—Inadequate facilities.
34—Heavy teaching schedules for the staff members.
29—Inadequate staff.
21—Wide variety of other extra-curricular activities.
20—Lack of student interest.
14—Pressure placed by sororities on pledges and under-classwomen.
11—Insufficient provision of funds.
10—Insufficient equipment.
9—Lack of administrative support.

Among other reasons given were:

Problem of commuting students.
Lack of student time.
Prevalence of dating after school.
Inter-group rivalries and antagonisms.
Playing fields too far distant from campus.
Existence of a four-year requirement in physical education.
Lack of previous training of students.
Lack of organization.

Letters of inquiry were sent to forty-seven women leaders in the field of physical education relative to eligibility for intramural participation, and the weight allowed on teaching schedules for time spent

in coaching the activities and supervising the procedures of the intramural organization. Forty-one answers were returned with statements regarding the indicated problems.[2]

Scholarship Eligibility.—The policy of prohibiting the participation of any student in intramural activities on the basis of her scholastic standing is not in general favor. In cases where restrictions exist, recommendations are most frequently made with the personal welfare of the individual in mind, and take the form of guidance rather than dogmatic regulations.

The policies advocated are expressed by the following statements and numbers for each:

18—Unlimited participation and competition.
8—Unlimited participation and competition subject to guidance.
4—Unlimited participation and competition but ineligible for all star, honorary, or championship teams.
1—Exclusion of students with low scholarship from teams as well as games.
4—Exclusion of students with low scholarship from all participation and competition.
1—Exclusion of probation students from class teams only.
1—Exclusion of probation students from all participation and competition.
1—Unlimited participation and competition but ineligible for awards.
1—Unlimited participation but excluded from all squads and teams.
1—Scholastic requirements for class teams and awards.
1—Failures excluded from championship events.

Teaching Weight for Faculty.—It is advocated as a general policy that staff members who are engaged in coaching, officiating, or supervising in the intramural program be allowed weight on their teaching loads. The pronounced trend is shown definitely by the following figures:

Thirty-seven allow the same weight as for activity classes.
One allows slightly less weight than for activity classes.
Three allow weight varying according to the acitvity.

Athletic Federation of College Women.—

Fifty-eight institutions answering the questionnaire are members.
Eighteen institutions are not members.
One did not indicate.

SUMMARY

Due to the broadening scope of intramurals for women, and the values accruing from participation in intramural activities, the attitude of administrators toward the importance of an intramural program in

[2] Percentage of return: 87.234.

the total program of physical education has changed significantly in respect to the amount of responsibility that should be assumed by the department in the futherance of voluntary participation.

The results have been the allotment of a greater amount of staff time to the organization and supervision of intramural activities; more adequate provisions for participation and participants; the broadening of principles and standards for women's competition; the establishment of non-competitive as well as competitive activities as a definite part of the program; and the provision for mixed recreation.

Strength Test Norms for College Women Entrants

By Erna Driftmier

EACH year five strength tests are usually given as a part of the physical examination of all entering college women. The question of standards or norms for these measures of strength has been raised. In order to determine whether factors of stature affected the various strength scores and to what degree they did so affect them, the height, weight, and age were taken, together with several strength measures, and intercorrelations were computed.

For these tentative correlations, the back strength was used as representing a group of big body muscles, and the left forearm was taken because it represented the muscles of one of the extremities which is usually least affected by ordinary activity. It was considered unnecessary to make the laborious computations for all five measures when they were probably similarly affected by the same factors.

The following zero orders of correlations were obtained: The back strength with age —.056 ±.019; with height .266 ±.018; with weight .367 ± .018. The left forearm strength with age .014 ± .021; with height .192 ±.020; with weight .304 ±.019.

It will be noticed that the correlation with age is in each case valueless; so to begin with, age can be entirely disregarded when dealing with strength norms for college women. The correlation of height and strength is more significant but not sufficiently so to be considered of value for predictions. This is further shown by the following partial correlations: the back strength on height with weight held constant is .110; the left forearm strength on height with weight held constant is .075. This shows plainly that when weight is removed as a factor, height has very little influence in the relationship. The weight has the highest correlation coefficient with strength. It obviously has more functional value as a strength determiner than either of the other two measures.

To find the regression line that would fit the curve of strength on weight was difficult. The straight line would fit the interquartile range quite accurately, though even there one found a curved line was slightly better in some cases. The straight line failed entirely to show fair values for the lower and upper extremities. This was especially true for the upper weight groups. There was a definite tendency for the strength scores to decrease with increased weight beyond a certain point.

After much tedious trial and error with mathematical formulas in an attempt to find the best fitting curve, these were finally abandoned. Instead, the free hand curve drawn to fit the means and allowing for the relative spread or deviation was used. Mr. Ezekial in his *Methods of Correlation Analysis* expresses a theory that when many variables enter into a relationship, the curve that fits one of these as a determiner is often complex, and only a very complex formula will interpret the relationship. Therefore to draw a curve to fit the statistical data and to compute the score relations from the graph is much more practicable and desirable.

This method was used in determining the strength values for each weight group. Such a strength weight table follows. The measures that were used in making these computations were taken from the records of the physical examinations of one thousand entering college women.

The correlation coefficients and the correlation ratios for the various measures are:

Back strength on weight r is .367 ±.018; n is .434 ±.017 *P.E.* est. is 8.31 *K*
Leg strength on weight r is .297 ±.020; n is .396 ±.013 *P.E.* est. is 13.20 *K*
Chest strength on weight r is .357 ±.018; n is .427 ±.017 *P.E.* est. is 3.87 *K*
R. forearm str. on weight r is .346 ±.020; n is .408 ±.016 *P.E.* est. is 3.11 *K*
L. forearm str. on weight r is .304 ±.019; n is .595 ±.014 *P.E.* est. is 2.09 *K*

In using the strength weight tables one should allow the range of the standard error of estimate for each score. A girl weighing 43 kilograms might find her score for the left forearm anywhere from two points above to two points below the norm given. So her score might range from 22 to 26, though the norm for her group is 24. The same girl would have given for leg strength 68.5 kilograms for the norm, but there should be allowed a range of 13.2 kilograms above or below the norm, so her strength would be considered good if it fell anywhere from 55.3 to 81.7 kilograms, or from 55 to 82.

WEIGHT STRENGTH TABLES IN KILOGRAMS

Weight	Back	Leg	Chest	R. forearm	L. forearm	Weight
91	79	91.6	31.8	31	28.5	91
90	80	92.5	32.3	31.5	28.8	90
89	80.5	93.5	33	31.7	29	89
88	81	94.4	33.4	32.2	29.3	88
87	81.5	95	33.8	32.5	29.5	87
86	82	95.5	34.4	32.8	29.6	86
85	82.5	96	34.8	33.2	29.8	85
84	83	97	35.1	33.4	30	84
83	83.5	97.6	35.3	33.8	30.2	83
82	83.8	98	35.6	34	30.4	82
81	84	98.5	35.8	34.2	30.5	81
80	84.4	99	36	34.3	30.5	80
79	84.5	99.6	36.2	34.5	30.6	79
78	84.8	100	36.3	34.6	30.6	78
77	84.9	100.5	36.2	34.6	30.7	77
76	85	100.8	36.1	34.7	30.7	76
75	85.1	101	36	34.7	30.8	75
74	85.2	101.4	35.8	34.8	30.8	74
73	85.2	101.5	35.5	34.8	30.9	73
72	85	101.5	35.3	34.8	30.9	72
71	84.5	101.3	35	34.7	30.9	71
70	84	101	34.8	34.6	30.8	70
69	83.8	100.6	34.5	34.5	30.8	69
68	83	100.2	34.3	34.3	30.7	68
67	82.5	100	33.9	34.2	30.6	67
66	82	98.5	33.7	34	30.5	66
65	81.5	98	33.3	33.8	30.4	65
64	81	97.8	33	33.6	30.2	64
63	80.5	97	32.6	33.3	30	63
62	79.5	96	32.3	33	29.8	62
61	79	94.8	32	32.8	29.6	61
60	78.2	93.5	31.8	32.5	29.5	60
59	77.5	92.6	31.3	32.3	29.3	59
58	76.5	91.5	31	31.8	29	58
57	75.5	90.5	30.7	31.5	28.8	57
56	74.8	89.2	30.3	31.3	28.7	56
55	73.8	87.8	30	30.9	28.4	55
54	73	86.5	29.8	30.6	28.2	54
53	72	85	29.3	30.3	27.8	53
52	71	83.5	29	29.9	27.7	52
51	70	82	28.7	29.5	27.5	51
50	68.9	80.2	28.3	29.3	27.3	50
49	68	78.8	27.8	29	26.8	49
48	66.8	77.3	27.4	28.7	26.5	48
47	65.5	75.6	26.9	28.3	26	47
46	64	74	26.4	27.8	25.7	46
45	63	72.5	26	27.5	25.2	45
44	61.5	70.5	25.4	27.2	24.7	44
43	60	68.5	24.8	26.7	24	43
42	58.8	67	24.3	26.2	23.3	42
41	57.5	64.5	23.8	25.5	22.5	41
40	55.5	63	23.2	25	21.7	40
39	53.8	61	22.5	24.3	20.5	39
38	52	59	21.8	23.5	19.3	38
37	49.5	57	21.2	22.5	18.2	37
36	47.5	55	20.5	21.5	17	36
35	44	53	19.3	20	15.8	35

WEIGHT STRENGTH TABLES IN POUNDS

I. Back Strength

Weight	Strength 0	1	2	3	4	5	6	7	8	9
70								96.5	99.9	103.4
80	106.0	108.0	110.2	112.7	115.0	116.8	118.7	120.4	122.1	124.0
90	126.0	127.6	128.9	130.1	131.3	132.6	134.1	135.6	137.1	138.6
100	139.7	140.7	142.0	143.5	144.9	146.2	147.5	148.7	149.9	150.8
110	151.7	152.8	153.9	154.9	155.9	156.8	157.9	158.8	159.8	160.8
120	161.7	162.5	163.5	164.4	165.3	166.0	166.8	167.8	168.8	169.8
130	170.8	171.5	172.2	173.0	173.8	174.4	174.9	175.6	176.6	177.5
140	178.0	178.6	179.1	179.6	180.1	180.6	181.1	181.6	182.1	182.6
150	183.1	183.8	184.6	184.9	185.1	185.5	186.1	186.6	187.1	187.4
160	187.6	187.8	187.8	187.8	187.7	187.6	187.5	187.4	187.3	187.2
170	187.1	187.0	186.9	186.6	186.3	186.2	186.1	185.8	185.4	185.1
180	184.9	184.7	184.4	184.1	183.6	183.1	182.6	182.1	181.6	181.0
190	180.6	180.1	179.6	179.1	178.6	178.0	177.5	177.0	176.5	175.8
200	174.8	173.8								

II. Leg Strength

Weight	Strength 0	1	2	3	4	5	6	7	8	9
70								116.5	118.5	120.5
80	122.5	124.5	126.5	128.6	130.6	132.6	134.6	136.6	138.6	140.1
90	141.6	143.7	146.2	148.3	149.8	151.4	153.4	154.4	157.4	159.4
100	161.0	162.5	163.6	165.2	167.3	169.0	170.7	172.2	173.7	175.1
110	176.5	178.2	180.0	181.6	183.1	184.6	186.1	187.6	189.1	190.6
120	191.9	193.2	194.6	196.0	197.3	198.6	199.9	200.8	201.9	203.0
130	204.1	205.0	205.9	207.1	208.4	209.6	210.8	212.0	212.9	213.9
140	214.7	215.5	215.8	216.0	216.4	216.9	217.9	219.4	220.6	220.8
150	221.0	221.4	221.8	222.2	222.6	222.9	223.2	223.5	223.7	223.8
160	223.8	223.8	223.7	223.6	223.3	222.9	222.6	222.4	222.1	221.8
170	221.5	221.0	220.8	220.2	219.7	219.1	218.5	218.0	217.4	216.9
180	216.4	216.0	215.6	215.2	214.6	214.0	213.1	212.1	211.3	210.8
190	210.3	209.8	209.3	208.7	208.1	207.2	206.3	205.3	204.4	203.4
200	202.5	201.6								

III. Chest Strength

Weight	Strength 0	1	2	3	4	5	6	7	8	9
70								42.4	43.5	44.7
80	45.6	46.3	47.0	47.6	48.2	48.9	49.6	50.3	51.0	51.6
90	52.2	52.8	53.3	53.8	54.3	54.8	55.4	56.0	56.6	57.2
100	57.6	58.0	58.5	59.0	59.5	60.0	60.5	60.9	61.3	61.8
110	62.3	62.7	63.1	63.5	63.8	64.1	64.4	64.7	65.2	65.7
120	65.9	66.1	66.4	66.7	67.0	67.4	67.8	68.1	68.4	68.7
130	69.0	69.5	70.0	70.2	70.4	70.7	71.0	71.3	71.6	71.9
140	72.3	72.7	73.0	73.4	73.7	74.1	74.4	74.6	74.9	75.3
150	75.6	75.8	76.0	76.3	76.4	76.9	77.1	77.3	77.6	77.9
160	78.1	78.3	78.6	78.9	79.1	79.3	79.4	79.6	79.7	79.8
170	79.9	80.0	79.9	79.8	79.7	79.6	79.5	79.2	79.0	78.8
180	78.6	78.4	78.1	77.8	77.6	77.4	77.1	76.8	76.5	76.1
190	75.6	75.0	74.4	74.0	73.6	73.2	72.8	72.2	71.5	70.9
200	70.4	69.9								

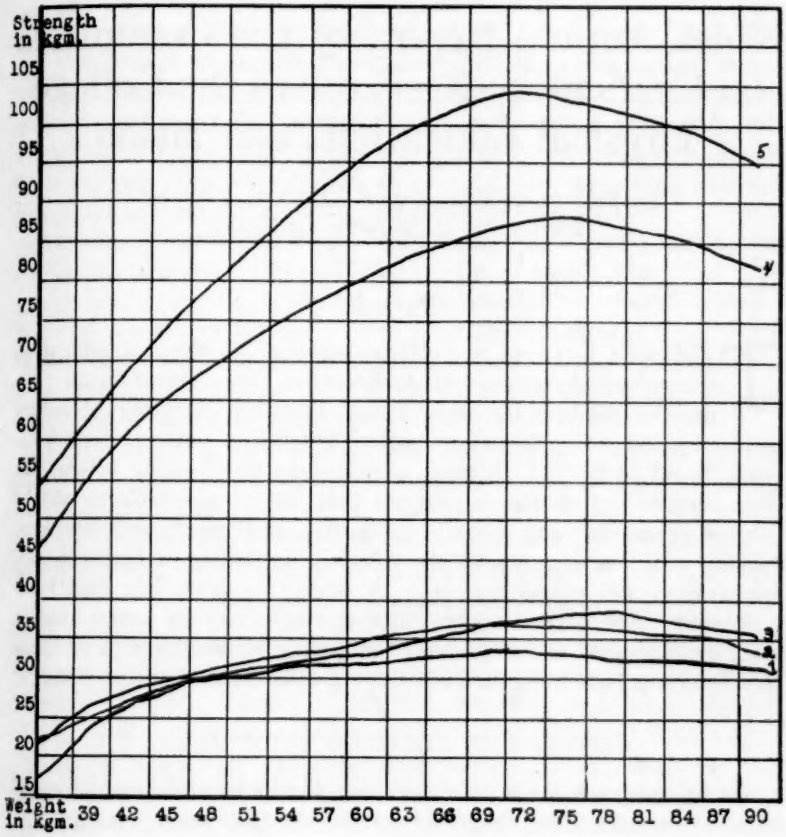
IV. Right Forearm Strength

Weight	Strength									
	0	1	2	3	4	5	6	7	8	9
70								43.9	45.4	46.9
80	48.0	49.0	50.0	51.0	52.0	53.0	53.6	64.3	55.0	55.5
90	56.0	56.7	57.4	58.0	58.5	59.0	59.5	60.0	60.3	60.6
100	60.9	61.2	61.6	62.1	62.5	62.9	63.3	63.6	63.9	64.2
110	64.6	64.8	65.0	65.3	65.7	66.1	66.5	66.8	67.2	67.5
120	67.8	68.1	68.4	68.8	69.1	69.3	69.6	69.9	70.2	70.7
130	71.2	71.4	71.6	71.9	72.2	72.4	72.6	72.8	73.2	73.5
140	73.8	74.1	74.3	74.5	74.7	74.9	75.1	75.3	75.4	75.5
150	75.6	75.8	76.0	76.2	76.3	76.4	76.5	76.6	76.7	76.8
160	76.9	77.0	76.9	76.8	76.7	76.6	76.5	76.5	76.5	76.4
170	76.4	76.3	76.3	76.2	76.1	75.9	75.7	75.6	75.4	75.3
180	75.1	74.9	74.7	74.5	74.1	73.7	73.6	73.4	72.9	72.5
190	72.2	71.9	71.6	71.3	71.0	70.5	70.0	69.7	69.6	69.2
200	68.7	68.1								

V. Left Forearm Strength

Weight	Strength									
	0	1	2	3	4	5	6	7	8	9
70								34.6	35.8	37.0
80	38.2	39.4	40.6	41.7	42.8	44.0	45.2	46.4	47.6	48.5
90	49.3	50.1	50.9	51.7	52.4	53.1	53.8	54.5	55.0	55.5
100	56.0	56.5	56.8	57.1	57.5	58.0	58.5	58.8	59.1	59.6
110	60.1	60.3	60.5	60.7	60.9	61.1	61.2	61.4	61.8	62.2
120	62.4	62.6	62.9	63.2	63.3	63.5	63.6	63.8	64.0	64.3
130	64.6	64.8	65.0	65.1	65.2	65.4	65.6	65.8	66.0	66.2
140	66.4	66.6	66.8	67.0	67.1	67.2	67.3	67.4	67.5	67.6
150	67.7	67.8	67.9	68.0	68.0	68.1	68.1	68.1	68.1	68.1
160	68.1	68.1	68.1	68.0	67.9	67.9	67.8	67.8	67.7	67.7
170	67.7	67.6	67.6	67.5	67.5	67.4	67.4	67.3	67.2	67.2
180	67.1	67.0	66.8	66.6	66.4	66.2	66.0	65.8	65.6	65.4
190	65.2	65.1	65.0	64.8	64.6	64.3	64.0	63.8	63.6	63.3
200	63.0	62.7								

STRENGTH-WEIGHT CURVES FOR 1000 COLLEGE WOMEN



1. Left forearm strength
2. Right forearm strength
3. Chest strength
4. Back strength
5. Leg strength

Ninth Annual Report of the Committee on Curriculum Research of the College Physical Education Association

By Professor Wm. Ralph LaPorte, *Chairman*
University of Southern California

Part I

THE need for a more uniform program of physical education throughout the schools of America has been evident to all progressive thinkers for many years. Probably everyone interested in physical education has at some time felt that a basic uniform program should be evolved. Always, however, the question has arisen, "Is it practicable to formulate a program that will be adaptable to widely varying geographic and climatic conditions, local needs and interests, varying facilities, and the widely differing viewpoints of teachers, administrators and school boards?" A second question has also been inevitable, "Would the various states and communities accept such a program if it could be formulated?" A partial answer to both of these questions is presented herewith in the report of Subcommittee Two.

OBJECTIVE OF THE CURRICULUM STUDY

The Curriculum Research Committee during its nine years of operation has been working definitely toward the time when consideration could be given to the possible adoption of a uniform program. As pointed out in last year's report the objective has been to formulate a comprehensive, graded program which would assure a common ground of basic skills and knowledge, with sufficient flexibility to be adaptable to the ordinary situation regardless of climatic conditions.[1]

To this end the committee has sought continuously to secure the cooperative participation of large numbers of representative leaders from all parts of the United States. It has been the hope that when completed, the curriculum would be acceptable to every state and district because it would be a composite program, participated in by their own representatives and adaptable to their peculiar needs and conditions.

[1] Wm. R. LaPorte, "Eighth Annual Report of the Committee on Curriculum Research," *Proceedings of the College Phy. Ed. Association*, 1935. Reprinted in the Research Quarterly, VII: 3 (Oct., 1936), p. 99.

PROGRESS TO DATE ON CONTENT OF CURRICULUM[2]

The constituent curriculum elements or activities have been evaluated as to relative worth in terms of physical, intellectual, social, safety, and recreational contribution; they have been allocated to appropriate grade levels to correspond to the peak of natural interest further supplemented by studies of child interests at different ages; they have been allotted appropriate amounts of time in the program according to their seeming value and difficulty of learning; they have been analyzed into basic elements or essential performance techniques on elementary and advanced levels, with suggested sequence and estimated time needed for the learning process in each case for the average student.

So far as content elements are concerned, this gives a body of material formulated in terms of best available judgment of outstanding experts throughout the United States, which should serve as an acceptable uniform program provided it can be made adaptable to varying conditions in widely separated sections of the country.

The problem of re-evaluating and adapting the program for this purpose was undertaken by the chairman of Subcommittee Two during the past year. The results of this study, which are presented herewith in Part II, have been surprisingly encouraging and give possibilities of rather startling developments during the next year.

OTHER ASPECTS OF THE STUDY

Supplementing this content aspect of the committee study are the four other phases which are being carried on as parallel and supplementary research. These include Subcommittee One, Determination of Aims and Objectives, Chairman, Frank S. Oktavec of Wayne University; Subcommittee Three, Determination of Suitable Teaching Situations and Teaching Techniques, Chairman, Professor C. L. Brownell of Teachers College, Columbia University; Subcommittee Four, Formulation of Standardized Achievement Tests, Chairman, Frederick W. Cozens of the University of California at Los Angeles; and Subcommittee Five, Establishing Appropriate Administrative Standards, Chairman, Frank S. Lloyd of New York University.

Subcommittees One, Three, and Five report progress during the past year, but without additional objective material in written form. Professor Brownell reports that his subchairmen are going forward with the plan approved by the Association last December, and he expects to have a number of them give their reports in person at the next annual meeting in 1937. Professor Cozens' report on Standardized Achievement Tests appears in Part III of this report, to be published in THE RESEARCH QUARTERLY, May, 1937.

[2] See previous committee reports in the *Proceedings* of the College Physical Education Association, 1929–1935 inclusive, or the RESEARCH QUARTERLY of the American Physical Education Association for March 1931, 1933; May 1930, 1932, 1934, and 1935; and October 1936.

Part II

Report of Subcommittee Two

SELECTION AND ADAPTATION OF ACTIVITIES

As explained above, the next step for Subcommittee Two seemed to be to determine the practicability and possibility of a widespread adoption of the proposed curriculum in the various states. The chairman accordingly selected as an advisory council the various state supervisors and the city supervisors in all cities of 100,000 and above. This constituted a group of about one hundred representative men and women.

THE PLAN OF PROCEDURE

A descriptive letter and questionnaire were sent to each of these persons, enclosing copies of charts showing the evaluation, grade placement and time allotment of activities, together with detailed charts indicating the teaching fundamentals with their sequence and time allotment. It was explained in the letter that the purpose of this particular study was to secure preliminary opinions from representative leaders in supervisory positions as to the suitability of the plan for general adoption.

Each was asked to give personal professional opinions rather than official commitments, with the understanding that if the opinion was sufficiently favorable the committee would plan to make necessary adjustments as recommended by the respondents, and later submit a formal proposal to state and city boards of education for official adoption of the program which would be formulated in the shape of a curriculum manual.

It was pointed out further that the committee's thought was not that the proposed program should be used as a rigid course of study, nor that it should in any sense be considered final, but rather that it might serve as the major skeletal structure of a program that could be adapted progressively to any average school system.

THE QUESTIONS ASKED

Each respondent was asked to answer the following questions with a *yes* or *no* answer, wherever possible, and to indicate any major changes he might wish to suggest.

1. In general are you satisfied with the relative evaluations given to the various activities for the several school levels? ..... Have you any major changes to suggest?

2. Are you satisfied in general with the grade and school level placement of the several activities from the fourth grade up? ..... Have you any major changes to suggest?

3. Are you reasonably well satisfied with the time allotment indicated in percentages for the several activities? ..... Have you any major changes to suggest?

4. Do you approve in general the number of activities listed for each school level or do you feel that there are too many or too few? ..... Have you any major changes to suggest?

5. Are you satisfied with the plan of having each activity offered in only two school levels? (For example, junior high school and senior high school.) ..... Would you make any exceptions to this plan?

6. Would you prefer to see a given activity offered in small amounts in each year of the two school levels, or in large amounts in possibly one year of each level, or have you other preferences?

7. Do you favor a "block" instruction program where one activity is offered consecutively from day to day for a period of from two to ten weeks ..... or do you prefer the "piecemeal" program with a different activity offered each day of the week?

8. In general are you satisfied with the list of fundamental elements or teaching units as determined by the 1935 study? (Copy attached) ..... Have you any major criticisms of this plan?

9. Are you reasonably well satisfied with the proposed teaching sequence and time allotment for these elements in most of the activities? ..... Have you any major criticisms?

10. Would you feel that the program should be specified and required in full for all students, or would you favor electives in some school levels? Please specify.

11. Do you favor definite, systematic instruction during the class period, with emphasis on the learning of skill techniques, rules, and social attitudes, with additional intramural laboratory periods for extensive practice and participation?

12. Or do you favor the informal recreation or play type of class period without systematic instruction? ..... If you favor this latter, how would you assure the mastery of skill techniques, rules and social attitudes?

13. If this proposed curriculum were to be submitted to your city or state for adoption as a skeletal program, would you be favorable to its approval as it is? ..... If not, what major changes do you feel you would have to insist upon before approving it for adoption?

14. If such program were to be submitted to states and cities for consideration for adoption, in what form would you suggest that it be made up for such presentation? i.e., would some combination of the attached charts be sufficient with a brief description or would a more elaborate presentation be necessary?

15. Please indicate any other suggestions or criticisms that you feel would be of help to the committee in reaching a decision relative to this proposal.

THE REPLIES

The response to this questionnaire was unexpectedly encouraging. Approximately half of the original questionnaires had been returned at the time the tabulation was made for this report. A surprisingly favor-

able attitude was indicated, with a total of 355 "yes" votes on all questions so answerable, and only 48 "no" votes. Many of the "no" votes were qualified with comments suggesting very minor modifications.

On questions 1, 2, and 3, thirty-nine gave affirmative replies and only three negative as to relative evaluation; thirty-eight voted approval and only five disapproval of the school level placement; while thirty-nine favored and three were opposed to the time allotment.

On questions 4 and 5, thirty-five considered the number of activities approximately correct with seven suggesting distinct modification; while thirty approved offering each activity in only two school levels and twelve preferred a wider distribution.

On question 6 opinion was somewhat divided, twenty-two preferring activities offered in relatively small amounts each year while twelve preferred large amounts in one year of each level. Many modifications, however, were suggested, many favoring the small amounts each year for the lower grades, with a larger concentration in one or two years in each level of the secondary and college groups.

On question 7 there was a strong predominance of opinion favorable to the "block" program of instruction as opposed to the "piecemeal" or varied program with a different activity offered each day. Twenty-five voted for the "block" program as opposed to eleven for the "piecemeal."

On questions 8 and 9, forty were satisfied with the list of fundamental elements or teaching units with two opposed; and thirty-nine favored the proposed teaching sequence and time allotment for these elements with only three opposed.

On question 10, thirty-one favored the required program up to the tenth or eleventh grade with some electives in the eleventh and twelfth grades and college. Seven preferred the required program up to the college level and electives thereafter, while three or four preferred a required program throughout.

On questions 11 and 12, thirty-eight respondents favored strongly a definite systematic instruction program during class periods, while only two preferred the informal play program. Many urged, however, that a small portion of the class period be assigned to actual game participation because of the fact that in many cases no intramural periods are available because of bus transportation problems and other schedule difficulties. There is a distinct need, also, for including zestful play as part of instructional procedure in order to give joy and emotional outlet, as well as to motivate the activity for future use. It should be recognized that it is possible to *overteach* as well as to *underteach*.

On question 13 thirty-one stated that they would be favorable to the adoption of the program in their city or state while only three were unfavorable. In many cases, of course, the vote was modified by the

statement that they would need to make minor adaptations to meet local conditions.

CRITICAL COMMENTS OF RESPONDENTS

In further elaboration of the responses on the fifteen questions, the following paragraphs will present the most significant suggested changes as proposed by the respondents.

On questions 1, 2, and 3 a wide variety of suggestions was made as to specific changes in evaluations, school level placement and time allotment, indicating their desire for a little greater flexibility in selecting and placing activities in terms of facilities, local interests, and teaching staff.

In the *elementary grade* levels it was particularly emphasized that swimming, in spite of its advantages, should be eliminated because of the fact that in most communities facilities are not available. It was repeatedly stressed also that in grades below the seventh, formal team games (including volleyball, soccer, and playground ball) should be eliminated except in the modified forms. A number of supervisors also urged that simple stunts be substituted for tumbling and pyramids below the seventh grade.

In the *junior high* level there was a definite demand for tennis, paddle tennis, handball, apparatus, and boxing. There was also a strong emphasis on the elimination of track and field for girls, and the substitution of nine-court basketball in place of regulation basketball for girls.

In the *senior high* level, it was emphasized that swimming should be added, taking the place of that eliminated in the grade level; that volleyball, soccer, tumbling, and pyramids likewise be included; that playground or softball be substituted in place of baseball for both boys and girls; that track and field for girls be eliminated; and that some activities such as fencing and squash, which require highly specialized equipment, be made elective rather than required.

In the *college* level there was throughout a strong emphasis on making the activities elective as to type in place of a specified, required program.

GENERAL COMMENTS

In general there was a definite opinion favorable to giving emphasis, where facilities are available, to such carry-over activities as hiking, camping, boating, riding, skiing, skating, snow shoeing, social recreation activities, badminton, bowling, tennis, and golf; with a wide list of choices, particularly in the specialized equipment activities, so that a given school could select those for which it is equipped, without having to teach all activities.

It is interesting and encouraging to find such a large majority of the

supervisors ready to recommend the adoption of the program with only very minor changes. One state supervisor replied, "We have already adopted it with slight revisions to meet local needs and facilities." This is characteristic of the comments affecting changes, most of them having to do merely with adaptation to climatic or equipment conditions.

The consensus of opinion relative to the form in which such a program should be submitted for adoption was that it would be desirable to have a condensed booklet or manual with a fairly elaborate description of the program elements, with charts showing the program by school levels, the fundamental elements to be taught, sample lesson plans for each unit, a bibliography, and a sufficiently detailed explanation so that legislators and others could see the needs and possibilities of such a plan.

QUOTED COMMENTS

In discussing the final question, number 15, dealing with general suggestions or criticisms, the following are typical comments: "Your whole outline is fine and should serve a general need." "Local sectional geographic and climatic differences should be definitely provided for. If universal adoption should result in a stereotyped program, I feel it would be most unfortunate. As a guide, it would be very helpful and suggestive." "The committee is to be commended for the fine piece of work." "This is needed by all states and will make the program much more uniform." "I believe the committee has done a fine piece of work in listing the fundamental elements or teaching units. No criticism." "Make provision for substitutes. For example, aquatics is not possible in the majority of schools regardless of beneficial results. Only one high school in the state of Nebraska has a swimming pool."

"I find in our city as well as in others I have visited, that there is a great need for just the thing your committee is working out and I am not so sure that the little differences we might find are so important. Rather the important thing is that we start something that is reasonably acceptable, and fit in as nearly as possible with the picture, with the possibility of changes if needed. In Chicago at the present time we are working along this very line."

"I wish we could get the national government to pass a law requiring that all states put in such a program. The state of Texas is twenty years behind times and nothing is done about it. In our system we cannot get the school board to buy equipment of any kind and most of the systems in Texas are the same." "I feel the committee has done a splendid job. Your variety of activities, classification and time allotment are just right."

These samplings will serve to show the general reaction of the respondents and give evidence of a recognition of a distinct need for a uniform program and of a general willingness to cooperate in establish-

ing it. A very small minority of three or four were not particularly favorable to the plan.

THE REVISED PROGRAM

The chairman made a very careful tabulation of the many suggestions submitted under appropriate headings, and has made minor changes in grade placement and time allotment of activities to correspond as closely as possible to the opinions expressed, while at the same time maintaining a practically workable schedule.

One of the difficult problems always faced by supervisors and instructors is that of working out a suitable schedule from the standpoint of climatic conditions and available facilities and equipment. Some activities that are suitable in certain localities cannot be used effectively in others. On the other hand there are some that can be incorporated in the program in almost any locality.

The chairman has accordingly arranged the activities for the junior and senior high school under two headings: first the *Core Program,* including primarily those activities that can be adapted to almost any situation; and second, the *Elective Program,* consisting of those activities which require special facilities, available in some schools and not in others. The activities proposed for the primary and elementary levels are flexible enough for adjustment to almost any situation. The revised program is presented in detail in the following series of tables arranged by school levels.

PROGRAM FOR THE PRIMARY GRADES

In order to give a complete picture of the program for all grades the activities listed for the first three grades in the original evaluation study were revised and are herewith included in Table I below.

TABLE I

PROGRAM FOR THE PRIMARY LEVEL (GRADES 1–3)

Activities	Per cent time*
1. Rhythmical Activities	25
2. Mimetics and Story Plays	20
3. Hunting Games	20
4. Relays	15
5. Stunts and Self-Testing Activities	10
6. Athletic Games of Low Organization	10
Total	100

* The time allotments indicated in percentages are approximate, merely to indicate the relative importance. These will vary somewhat with grade, relays receiving emphasis from the second grade on, and athletic games from the third grade on. In many cases the activities included under the several headings will be selected from the subject matter of a given *unit of work* or *center of interest* around which the entire program of a given grade may be centered. It is very important that the physical education activities be integrated with the rest of the program of this level.

PROGRAM FOR THE ELEMENTARY GRADES

In revising the program for the elementary (or intermediate) level—grades four, five, and six—it has been necessary to keep in mind the strong emphasis on the elimination of swimming and of the highly organized team games in favor of the modified, or games of low organization. The approximate time allotments, however, have been retained as nearly as possible, with modified terminology. The chairman has suggested in Table II a classification of games of low organization, which will serve to provide a sound preliminary training in the fundamentals of the four major team games, basketball, playground (soft) ball, soccer, and volleyball. The revised program appears below in Table II.

TABLE II

PROGRAM FOR THE ELEMENTARY LEVEL (GRADES 4–6)

Activities	Per cent time*
1. Athletic Games of Low Organization	25
2. Rhythmical Activities	20
3. Hunting Games	15
4. Individual Athletic Events (self-testing)	10
5. Mimetics and Free Exercises	10
6. Relays	10
7. Tumbling Stunts	10
Total	100

CLASSIFIED ATHLETIC GAMES OF LOW ORGANIZATION†

I. BASKETBALL TYPE	II. PLAYGROUND BALL TYPE	III. SOCCER TYPE	IV. VOLLEYBALL TYPE
Captain Ball	Bombardment	Advancement	Boundball
Captain Basketball	Batball	Circle Soccer	Featherball
Cornerball	Circle strike	Corner Kickball	Netball
Line Basketball	Endball	Fieldball	Schoolroom Volleyball
Nine-court Basketball	Fongo	Hand Polo	Spongeball
Newcomb	Hit Pin Baseball	Kickball	
Six-hole Basketball	Longball	Kick-over Ball	
Six-court Basketball	One old cat	Pin Football	
Quadruple Dodgeball	Two old cat	Punt Back	
	Triangle ball	Rotation Soccer	
	Work up	Simplified Soccer	
		Soccer Dodgeball	
		Soccer Keep-Away	

* Here again the time allotments in percentages are approximate, to suggest relative importance. The selection of activities as in the primary level should be adapted closely to the *center of interest* or *culture area* being studied at the time in a given grade. It is suggested that the self-testing athletic events be practiced as an integral part of the corresponding game of low organization and that many of the relays be composed of elements of the same game. Tumbling stunts should be kept very simple, and rhythmical activities should include good variety.

† Descriptions of these games can be found in most game books and elementary school manuals.

PROGRAM FOR THE JUNIOR HIGH SCHOOL

In revising the program for the junior high school, a few additions and eliminations were effected in terms of the recommendations of the respondents, and minor adjustments in time allotment were made to simplify the problem of scheduling. Some changes were made in terminology, as for example, using the general term "rhythms" in place of specifying the various types of dancing; and combining heavy apparatus, marching and gymnastic drills under one uniform heading. This gives the individual school greater freedom in selecting the particular type of rhythmic or gymnastic work to be emphasized.

It will be noted also that the program is listed under the two headings mentioned above, No. I—The Core Program, and No. II—The Elective Program. The time allotments are in units or multiples of six weeks, on the assumption that the average school will have 36 weeks a year, or a total of 108 weeks in a three-year period. An activity that is allotted six weeks could be given continuously all in a single year or it could be divided into two years, three weeks to each year, or into three years, two weeks to each year, according to the preference of the locality or given school. If the first plan were followed, a given semester's program on the average would consist of three different activities of six weeks each.

In case swimming facilities are not available and cannot be secured, it would, of course, be necessary to eliminate it from the program except for basic land drills. This would then release more time for the other phases of the program. It will be noted that the elective program constitutes nearly one third of the total, thus giving reasonable freedom for special activities of the individual or carry-over type. The details of the program are indicated in Table III on page 96.

PROGRAM FOR THE SENIOR HIGH SCHOOL

In revising the program for the senior high school level it was necessary to add several activities that had been eliminated from the elementary level, notably swimming, volleyball, tumbling and pyramids, softball, and soccer, together with the elimination of track and field events for girls. The proposed program appears in Table IV on page 97. A suggested schedule for a combined core and elective program is presented in Table V on page 98.

THE COLLEGE PROGRAM

In revising the college list, an effort was made to observe the recommendations of the respondents that the program be more or less elective throughout. In Table VI on page 97 appear the suggested activities, each listed as a semester course of an advanced type, including, of

course, review of fundamentals and the suggestion that students be permitted to elect any course that they might wish, except in cases of those limited because of physical handicaps. The emphasis throughout is on individual or carry-over types of activities.

TABLE III

PROGRAM FOR THE JUNIOR HIGH SCHOOL (GRADES 7–9)*

I. Core Program	Weeks for Boys	Weeks for Girls	II. Elective Program† (Boys—30 weeks) (Girls—36 weeks)
1. Basketball (elementary)	6	..	1. Badminton
2. Basketball (9-court) (elem.)	..	6	2. Boxing
3. Gym. drills, marching, and apparatus (elementary)	12	12	3. Boating
4. Rhythms (elementary)	12	18	4. Golf
5. Softball (playground) (elem.)	6	6	5. Handball
6. Soccer or speedball (elem.)	6	6	6. Hiking and camping
7. Swimming and diving (elem.)	12	12	7. Horseshoes
8. Touch football (elem.)	6	..	8. Paddle Tennis
9. Track and field (elem.)	6	..	9. Riding
10. Tumbling and pyramids (elem.)	6	6	10. Skating
11. Volleyball (elementary)	6	6	11. Skiing
	78	72	12. Snow shoeing
Electives	30	36	13. Social games and dances
	108	108	14. Tennis
			15. Wrestling

* The time allotments here again are approximate in terms of relative values and are subject to minor adjustment. They are listed in terms of weeks. A given activity can be concentrated in one year with a specific number of weeks or it may be split between two of the three years or distributed equally between the three years according to preference of a given school. For suggestions on schedule see Table V. If desired it is possible to schedule the activities to fit seasonal sports. It is suggested that relays, gymnastic or group games, and athletic games of low organization be used as preliminary preparation for the regular games involving the same elements. The athletic games of low organization are classified in Table II.

It is understood that this schedule is for class instruction purposes, to be supplemented by an opportunity for extensive intramural participation by all students. Where this extra laboratory period is not available, probably the last fourth or third of the regular class period should be devoted to enthusiastic participation in the activity or game being studied. In any case sufficient participation should be given in the class period to assure adequate motivation and appreciation of the game as a unified whole.

† Elective program to be selected according to available facilities devoting from 3–6 weeks to each activity selected.

SUMMARY

In brief review of the proposed program, it will be noted that in the primary and elementary levels the student is given a broad exposure to a variety of activities in a balanced program of rhythms, gymnastic and group games, stunts, and athletic games of low organization leading up to the more highly organized games. In the junior and senior high school he is given a definite exposure to all the major team games in elementary and advanced form, covering at least twelve weeks of spe-

cific class instruction in each. In addition he is given elementary instruction in a wide variety of individual or dual games with particular value for carry-over purposes. In the college level he is then given opportunity for advanced training in courses which have special appeal to him, with emphasis again on the type of activity that has possibilities for carry-over as a life-time hobby.

TABLE IV

PROGRAM FOR THE SENIOR HIGH SCHOOL (GRADES 10–12)*

I. Core Program	Weeks for Boys	Weeks for Girls	II. Elective Program† (Boys—36 weeks) (Girls—36 weeks)
1. Basketball (advanced)	6	6	1. Archery
2. Gym. drills, marching, and apparatus (advanced)	6	6	2. Badminton
3. Field hockey	..	6	3. Boating
4. Rhythms (advanced)	12	18	4. Bowling
5. Soccer or speedball (adv.)	6	6	5. Boxing
6. Softball (playground) (adv.)	6	6	6. Camping
7. Swimming, diving, and livesaving (advanced)	12	12	7. Fencing
8. Touch football (advanced)	6	..	8. Golf
9. Track and field (advanced)	6	..	9. Fly casting
10. Tumbling and pyramids (adv.)	6	6	10. Handball
11. Volleyball (advanced)	6	6	11. Hard baseball
	—	—	12. Hiking
	72	72	13. Horseshoes
Electives	36	36	14. Riding
	—	—	15. Skating
	108	108	16. Skiing
			17. Snowshoeing
			18. Social dancing
			19. Social games
			20. Squash
			21. Table tennis
			22. Tennis
			23. Water polo
			24. Wrestling

* Most of the comments at the bottom of Table III apply equally to this table. The program is divided between core and elective divisions, each school to select those from the two divisions for which it has adequate facilities. It is recommended that each activity be given for at least six weeks continuously, at this level. This would mean that the class instruction in a given activity such as basketball would appear in only one of the three years of the senior high. A student should have opportunity, however, for additional participation in the intramural program or the interschool team program.

It is recommended that the elective program, consisting primarily of the individual carry-over type of activities, constitute *at least* a third of the total program for the three years. If desired, this aspect of the work might be made in the form of a varied offering of electives in the twelfth grade, from which the student himself might select. If this were done the program for the tenth and eleventh grades should be composed of the items in the No. I or Core Program list. A sample schedule of such a plan is suggested in Table V. If this arrangement is not acceptable or desirable, the activities in the elective program, No. II, can be distributed in the schedule alternating with activities from No. I, devoting from three to six weeks for each one selected.

† Elective program to be selected according to available facilities, devoting from 3–6 weeks to each activity.

It would seem that such a program would provide for the average student an adequate opportunity for physical, mental and social development, with preparation for life-long interest in athletic hobbies. Naturally, however, the success of the program will depend upon the degree to which administrators and teachers accept it and give it proper emphasis. Its adoption as a uniform basic curriculum throughout the country would do much to assure that the child in a given community would have reasonable opportunity for such training.

RECOMMENDATIONS

In view of the fact that the proposal for adoption of a uniform program has been given such an enthusiastic reception on the part of the

TABLE V

SUGGESTED "BLOCK" CORE AND ELECTIVE PROGRAM (BOYS AND GIRLS)*

(Core program for 10th and 11th grades, elective program, 12th grade)

Core Program		Elective Program
I. Tenth Grade	II. Eleventh Grade	III. Twelfth Grade
Sept.-Oct.		
1. Soccer or speedball	1. Touch football (boys) Hockey (girls)	1. Golf (or archery)
Nov.-Dec.		
2. Basketball	2. Volleyball	2. Badminton (or table tennis)
Jan.-Feb.		
3. Tumbling and pyramids	3. Gymnastic drills and apparatus	3. Handball (or squash)
Feb.-Apr.		
4. Rhythms	4. Rhythms	4. Social dancing (or soc. games or skating, skiing, or snowshoeing)
Apr.-May		
5. Track and field (boys) Rhythms (girls)	5. Softball	5. Boxing (or wrestling or fencing)
May-June		
6. Swimming and diving	6. Swimming and diving	6. Tennis (or horseshoes or boating, riding, camping or hiking).

* The above schedule can be used as a graded program; or in schools where it is impossible to schedule students according to grades it can be used as a "cycle" program for the tenth and eleventh grades, with both tenth and eleventh graders mixed together in classes, all of them taking the number I program one year and the number II program the next year. The twelfth graders would then have to be registered separately for the elective program. If it is impossible even to schedule the twelfth graders separately, a three-year cycle program can be used without student electives, combining elements of the number III program with the I and II, thus providing three separate and distinct requirement programs, each offered a different year in cycle, with all students taking the same class instruction in a given year.

Another modification of the elective program is to offer one elective term in the eleventh grade and one in the twelfth grade. In this case the tenth grade would be all required; the eleventh grade, the first semester required and the second elective; the twelfth grade, the first semester elective and the second required; or other similar adjustment.

state and city supervisors, the chairman wishes to recommend to the association:

First.—That he be given authorization to proceed with the formulation and publication of an official *Curriculum Manual* to consist of approximately twenty-five pages of condensed material, including the revised program with suggestions on its organization and administration.

Second.—That he be authorized to submit this manual to all state boards of education, incorporated city boards of education, and county boards of education for purposes of reaching the rural school districts, with the recommendation that they adopt the program as their official basic curriculum in physical education.

Third.—That he be authorized to contact various other national organizations, such as the American Physical Education Association, the National Education Association, the State Directors' Association, the City Director's Association, and others for official approval of the plan, in order thereby to encourage its adoption by boards of education.

Fourth.—That the Association authorize the expenditure of funds sufficient to cover the publication and mailing of the manual, estimated at $125.00 for a thousand copies.

TABLE VI

PROGRAM FOR THE COLLEGE LEVEL (GRADES 13–16)*

1. Apparatus†
2. Archery
3. Badminton
4. Boxing
5. Diving
6. Fencing
7. Folk dancing
8. Golf
9. Handball
10. Lifesaving
11. Modern dance (creative, interpretive)
12. Social dancing
13. Social (recreational) games
14. Squash (or squash racquets)
15. Swimming
16. Tap and clog dancing
17. Tennis
18. Tumbling
19. Wrestling
20. Team games (when needed) (basketball, volleyball, soccer, speedball, baseball, touch football, hockey, lacrosse, American football).
21. Specialties (if needed) (winter activities, outdoor activities, etc.).
22. Restricted and corrective for subnormal cases

* Combinations of two activities in a given semester may seem desirable in some cases although college students usually seem to prefer to concentrate on one activity for a term so that they may master it reasonably well. It will be noted that most activities are of the individual type. Classes in team games might be organized if the demand is sufficiently great, although it is assumed that students will have received a good training in these activities in the junior and senior high school. The college intramural program should give them adequate opportunity for participation in the team games if they wish it.

† Each activity is listed as a one-semester course of an advanced type with the *necessary review of elementary fundamentals* in each case; students to have the privilege of electing any activity for which they are not unfitted by a physical handicap.

Part III

(To be published in the next issue of THE RESEARCH QUARTERLY.)

Part IV

GENERAL RECOMMENDATIONS

The chairman wishes to recommend that the committee be continued, to carry out the plans already projected, and that the specific recommendations submitted at the end of Part II, affecting the work of Subcommittee Two, be approved.

Respectfully submitted,

C. L. BROWNELL
F. W. COZENS
FRANK LLOYD
FRANK L. OKTAVEC
WM. R. LAPORTE, Chairman

An Age-Height-Weight Table for College Women

By MARGARET MCCALL
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AT THE present time there are several age-height-weight tables for women stating an exact weight for a given age and height. During the past few years, however, there has been an increasing need for an age-height-weight table for women which will measure the variability of weight of a given age group at a given height. Such a table for men was reported by Dr. Frederick W. Cozens in 1931. The ordinary tables which do not allow for variation in weight are not satisfactory.

The purpose of this limited study is to attempt to provide an improved table for determining the correct weight of college women of various ages and heights. This study was conducted over a period of five years at Mary Hardin-Baylor College at Belton, Texas, and 1,979 college women were involved. The data were collected in September of each year when physical examinations were given and the figures in the tables represent "stripped" heights and weights.

Table I shows the number of cases involved in the computations at each inch of height for each age.

Table II shows the average weight for a given inch of height at a given age and shows the amount that weight varies. Between the limits

TABLE I

SHOWING THE NUMBER OF WOMEN INVOLVED IN THE COMPUTATIONS

Ht.	Age 16 and Under	17	18	19	20	21	22	23 and Over	Totals
5-10	1	5	3	1	5	1	2		18
5-9	3	12	12	7	2	2	1	2	41
5-8	5	20	22	27	8	5	3	9	99
5-7	13	30	29	35	19	10	1	3	140
5-6	16	47	72	41	32	14	9	8	239
5-5	26	76	84	63	46	16	16	12	339
5-4	17	82	100	71	32	23	7	14	346
5-3	23	60	69	62	46	14	9	17	300
5-2	18	54	67	45	24	17	8	14	247
5-1	7	32	35	26	14	16	1	10	141
5	2	14	19	6	6	2			49
4-11	1	2	5	7	3		2		20
Totals	132	434	517	391	237	120	59	87	1979

of one probable error on each side of the mean are contained 50 per cent of the cases in a normal distribution. Therefore, according to this table, we may expect to find that 50 per cent of college women who are 5′4″ in height and who are 18 years of age weigh between 108 and 128 pounds.

TABLE II

AGE–HEIGHT–WEIGHT TABLE FOR COLLEGE WOMEN

Ht.	16 and Under	17	18	19	20	21	22	23 and Over
5–10		142	149		140		149	
		11.8	10.2		6.8		9.12	
5–9	123	134	133	140		133		145
	15.5	8.1	14.4	7.5		6.1		10.8
5–8	127	136	144	138	136	142	140	140
	4.9	11	9.1	10.5	12.2	17.9	4.7	9.9
5–7	125	134	129	136	136	130		141
	9.9	13.7	11.8	12.1	11.9	7.6		7.2
5–6	117	126	124	123	129	133	130	128
	9.4	10.5	9.9	8.6	9.2	5.4	7.5	9.7
5–5	120	120	121	122	122	126	136	129
	7.5	9.4	11.4	10.2	12.2	8.6	11.6	15
5–4	122	116	118	121	120	119	119	118
	10.2	7.5	10	12	13.3	8	7.5	8.2
5–3	118	113	112	117	116	118	114	123
	10.9	9.3	9.2	8.7	8.7	8.1	8.4	11.7
5–2	111	111	111	110	115	114	118	118
	10.5	7.4	8.7	6.1	7.2	7.1	14.4	7.3
5–1	110	109	110	107	112	111		106
	6.4	9	7.08	9.1	7	7.7		6.5
5		101	110	104	105	100		
		8.8	9.8	4.8	9.6	6.7		
4–11		99	100	103	108		109	
		3.6	8.2	5.7	3.2		2.7	

NOTE: Weight listed = Mean; just below it is listed the P.E. Between the limits of the mean ± 1 P.E. are included 50 per cent of the cases.

This study would indicate that a variation in weight is to be expected in a given age group at a given height and that one figure should not be used in determining the correct weight for a given group of the same age and height. There are various reasons for variables in weight such as race, type, or familial reasons. Further studies including a larger number of students and conducted over a longer period of time should be made, but this one study suggests the advisability of using an age-height-weight table which allows for variation in weight. This opens the way to a more comprehensive study which may go further and include all ages and both sexes.

Aims and Objectives of Physical Education Activities

Primary, Grammar Grades, and Junior High Schools

By the Research Committee of the Newark Physical Education Association

Public Schools, Newark, New Jersey

Walter L. Aurnhammer
Ira Kanowith
Solomon Fleischman
Gerald A. Garafola
Mary H. Laffin
John N. Richards, *Chairman*

I. The Need, The Problem, and Method of Investigation

The Need.—For a period of two years, the Research Committee of the Physical Education Association of the Public Schools, Newark, New Jersey, has been engaged in the study of a problem pertaining to "Aims and Objectives of Physical Education Activities for Primary, Grammar Grades, and Junior High Schools." The urge to attempt this research problem was due primarily to the searching inquiry not only upon the part of taxpaying groups interested particularly in the reduction of municipal costs but of certain educators as well. Those of the education group were vitally interested in evaluating, in terms of worth, the content subject matter as found in the school curriculum as a whole. Definite action has been taken upon our part to solve this problem in the endeavor to satisfy these investigators and ourselves as to what is essential in child development.

The Problem.—In the light of modern educational trends, to determine, if possible from authentic sources, professional publications and experience, coupled with actual field operation as a testing procedure, the true worth of the various activities now used as mediums of instruction in the field of physical education.

Method of Investigation.—To follow this line of attack, it was deemed advisable to call upon certain experts in the field of physical education for guidance in order that this important undertaking might represent a *true cross section of many opinions rather than the reaction of a small committee group.*

Acknowledgments.—The members of the Committee regret that space limitations make it impossible to list here the names of the many individuals who have contributed to this study, and whose helpful co-

operation is here acknowledged with gratitude and appreciation. All quotations are made with the permission of the publishers.

II. Aims, Objectives, and Goals

The meaning of aims, objectives, and goals.—"The terms aims, objectives, and goals are used interchangeably by many people. What one person means when he uses the word aims may be the connotation of objectives as used by another. There is no reason for using these terms in any particular sequence but in order that there might be some basis of agreement for the purposes of this discussion, the following distinctions are suggested:

"*Aims* are the big, general things toward which all education is directed.

"*Objectives* are more specific and definite things that lead up to the aims and help in achieving them.

"*Goals* are still more explicit and specific things, the accomplishment of which will help in attaining one or more of the objectives and thereby contribute to achieving the aims. For example, if we agree with Herbert Spencer that the aim of education is 'complete living,' one of the objectives of education which would help in achieving 'complete living' might be the 'preparation for the worthy use of leisure,' and a goal that would contribute toward the accomplishment of this objective could well be to develop in all persons enough skill to enable them to play golf satisfactorily."[1]

THE AIM OF PHYSICAL EDUCATION

"Organized physical education should aim to make the maximum possible contribution to the optimum development of the individual's potentialities in all phases of life, including his finest possible capacity for adjustment to the world in which he lives, by placing him in an environment as favorable as possible to the promotion of such big-muscle and other responses or activities as will best contribute to this purpose."[2]

[1] Jackson R. Sharman, *Introduction to Physical Education*, (New York: A. S. Barnes and Co., 1934).

[2] E. W. Nixon and F. W. Cozens, *An Introduction to Physical Education*, (Philadelphia: W. B. Saunders Co., 1934), p. 85.

III. Objectives, Grades One and Two

PROMINENT CHARACTERISTICS

"*Ages 6–8*

Lacks physical power
Hunger for exercise
Developing finer motor coordinations and fundamental skills
Fighting tendency prominent
Love of chasing and being chased
Story interest
Susceptible to fatigue
Slow physical development
Curiosity and imitation still strong
Interest in rhythm
Some decline in individualism and self-assertion and beginning of cooperation
Interest in more advanced forms of manipulation and construction."[3]

To serve these needs, the following activities are suggested: Story Plays, Rhythm Plays, Simple Rhythms and Folk Dances, Stunts and Games, and Relays of Low Organization.

STORY PLAYS

Educational.—

1. To develop creative ability, appealing to the dramatic and imaginative instinct.
2. To teach customs pertaining to vocations or professions of everyday life of the home and community.
3. For correlation with project units.

Emotional.—

1. To provide satisfaction and happiness through participation in enjoyable activities.
2. To provide an opportunity for freedom and spontaneity of individual expression.
3. To afford an opportunity for relaxation from mental strain.
4. To afford an opportunity to express fundamental instinct tendencies in some form of wholesome motor expression such as running, jumping, chasing, and throwing.

Physiological.—

1. To provide beneficial results as an outgrowth of large muscle activity:
   a) Organic Development. Promotion of growth and development, strength, and endurance.
   b) Neuro-muscular Control. Development of physical skills and coordination.
   c) Increased vitality and stamina.

[3] E. W. Nixon and F. W. Cozens, *Op. Cit.*, p. 115.

Social.—

1. To promote the recognition of self as part of a group—cooperation.

RHYTHM PLAYS

Educational.—

1. To offer an opportunity for correlation with music and to some extent with the project and activity method of instruction.
2. To harmonize the teaching of rhythm in the kindergarten with the primary grades.
3. To stimulate expression of the imagination.

Emotional.—

1. To provide an opportunity for relaxation from mental strain and muscle tension.
2. To afford an opportunity for dramatic expression and development of creative effort.

Physiological.—

1. To allow for the development of fundamental instincts of rhythmical nature.
2. To promote the development of neuro-muscular controls resulting in soothing effects upon the nervous system.

Social.—

1. To develop cooperative effort through the group situation.
2. To teach proper boy and girl relationships.
3. To develop skills that will carry over into leisure-time activities of boys and girls.

SIMPLE RHYTHMS AND FOLK DANCES

Educational.—

1. To develop a cultural background, dramatic expression, and artistic appreciation. Dancing is the art side of physical education.
2. To teach national customs and folk traditions of various peoples.

Emotional.—

1. To allow for the wholesome expression of the emotions through the medium of the expenditure of joyous energy.
2. To provide an opportunity for the expression of rhythmic urges and interests.

Physiological.—

1. To afford an opportunity for training in rhythmic fundamentals leading to movements requiring greater neuro-muscular control, grace, poise, and harmonious development.
2. To aid in the development of rhythmic ability.
3. To develop increased functional activity through the medium of big-muscle activity and organic power.

Social.—

1. To promote the recognition of group purposes.

2. To develop skills that will carry over into the leisure-time activities of boys and girls for enrichment of life.

STUNTS

Educational.—

1. To aid in the development of desirable character traits such as courage, self-confidence, perseverance, initiative, emotional control, cooperation and poise.

Emotional.—

1. To provide an opportunity for freedom and spontaneity of individual expression.

2. To develop skills that may form a basis for leisure-time activity.

Emotional-Social.—

1. To provide challenging situations for the child in the form of wholesome recreational activities of the "do-or-dare" type of socialized nature.

2. To satisfy the innate desire for achievement and accomplishment.

Physiological.—

1. To afford an opportunity to express fundamental instinct tendencies in wholesome recreational activities.

2. To promote muscular control and quick, accurate mental-physical reactions.

3. To aid in the development of increased functional activity resulting in greater strength, endurance, and vitality.

GAMES AND RELAYS OF LOW ORGANIZATION

Educational.—

1. To aid in the development of such character traits as fair play, cooperation, social relationships and ethical character.

2. To aid in the development of interests and skills for the proper use of leisure time.

3. To afford an opportunity to determine individual capacities and limitations pertaining to leadership and followship qualifications, originality, initiative, courage, and self-control.

Emotional.—

1. To offer a challenge to attempt the difficult, and afford an opportunity for satisfaction in accomplishment through interested participation in wholesome recreational activities.

Physiological.—

1. To afford an opportunity to express fundamental instinct tendencies through the medium of big-muscle activities such as running, jumping, fleeing, chasing, throwing, and striking.

2. To develop desirable neuro-muscular controls relating to game situations requiring skill and technique.

3. To aid in the increased functional activity resulting in greater strength, endurance, and power.

Social.—

1. To afford an opportunity for social adjustment through the recognition of self as a part of a group.

2. To learn to subordinate individual interests to the interests of the group.

Social-Moral.—

1. To overcome personality abnormalities in forms of anti-social behavior.

2. To afford an opportunity to participate in socialized activities of a desirable type.

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IV. Objectives, Grades Three and Four

PROMINENT CHARACTERISTICS

"*Ages 9–11*
Rapidly developing motor coordinations
Less individualistic and self-assertive
Lack of perseverance
Cooperation more prominent
Beginning of gangs, clubs, etc.
Girls highly interested in rhythmic activities
Period of slow growth
Desire for adventure
Interested in fighting and hunting activities
Rivalry and gregariousness become prominent
Boys and girls desire to be separated in activities."[5]

To serve these needs, the following activities are suggested: Tactics, Free Exercises, Folk Dances, Stunts, Games, and Relays of Low Organization.

TACTICS

Educational.—

1. To develop an alert response to commands in order that groups may be moved in an orderly manner from one place to another without confusion. A safety factor applicable to school and life situations.

2. To learn to follow directions, to be obedient, to respect authority—essential attitudes in the world of human relationships.

3. To aid in the development of rhythmic sense as well as group coordination combined with accuracy and precision of movement.

Physiological.—

1. To afford an opportunity for the development of good habits of locomotion for efficiency in movement and conservation of energy.

Social.—

1. To promote morale as expressed in a sense of group unity working for a common purpose.

FREE EXERCISES

Educational.—

1. Through the medium of mimetic exercises to afford an opportunity for dramatic and creative expressions.
   a) Dramatization of stories in English
   b) Dramatization of trades and occupations
   c) Dramatization of experiences.

2. The formation of proper exercise habits and attitudes that may carry over into adult life.

3. To promote muscular and organic development.

[5] E. W. Nixon and F. W. Cozens, *Op. Cit.*, p. 116.

Emotional.—

1. To offer a challenge to attempt the difficult and to afford an opportunity for satisfaction in accomplishment through interested participation in directed activities.

Physiological.—

1. To develop systematically through directed motor activity:
   a) The muscles of the body for strength
   b) The internal organs of the body for vitality
   c) The large nerves of the body for stamina and functional power.
2. Through the medium of localized muscular controls to correct faulty body mechanics and aid in the maintenance of good posture.
3. To develop desirable neuro-muscular controls resulting in physical efficiency for economical and effective bodily movements.
4. Through controlled motor activities to develop the fundamental instincts of rhythmical nature.

Social.—

1. To develop the subordination of self and the recognition of group purposes in enterprises intended for the common good.

FOLK DANCES

Educational.—

1. To promote cultural development through appreciation of folklore and music of other countries. They may be readily correlated with the project or activity methods of the classroom instruction.

Emotional.—

1. To develop latent artistic powers and afford an opportunity for dramatic expression, esthetic appreciation, and creative effort.

Physiological.—

1. To meet the biological needs of the child for growth and development.
2. To develop graceful and effective movements which arise out of the innate desire of the child for rhythmic expression.

Social.—

1. Through interested participation in these wholesome activities, to promote individual adjustment to the needs of a group for the development of worthwhile social traits such as cooperation, good fellowship, friendliness, thoughtfulness, and tolerance.
2. To develop interests in motor skills of an enjoyable nature that will carry over into the leisure-time activities of children.

STUNTS

Educational.—

1. To aid in the development of favorable attitudes such as courage, perseverance, self-control, confidence, and initiative.

2. To develop an appreciation of the value of wholesome activities natural to childhood which can be used in the play life of boys and girls after school.

Emotional.—

1. To afford an opportunity for the child to test his own strength, skill, and originality in a group situation through activities of a big-muscle nature.

2. To provide opportunities for satisfaction in accomplishment.

Emotional-Social.—

1. To aid in the development of proper emotional control.

2. To direct the formation of attitudes and ideals with respect to the child's social relationships.

Physiological.—

1. To further the development of organic power and aid in the acquisition of fundamental neuro-muscular controls through wholesome activities that satisfy strong natural desires.

2. To provide the means for determining individual capacities and limitations pertaining to endurance, agility, and quick and accurate mental-physical reactions.

GAMES AND RELAYS OF LOW ORGANIZATION

Educational.—

1. To satisfy the natural instinctive desires of the child for physical expression in the form of big-muscle activity of recreational nature.

2. To provide interests and appreciations of the value of group recreational activities for the effective use of leisure-time.

Emotional.—

1. To develop emotional stability, alertness, originality, resourcefulness, initiative, loyalty, consideration of others, through directed and wisely controlled leadership in big-muscle activities of a group nature.

Physiological.—

To aid in the attainment of organic power, stamina, endurance, and vitality, through increased respiration, circulation, and nutritive function.

2. To develop mechanical efficiency in game skills requiring continued effort and practice for perfection.

Physiological-Emotional.—

1. To relieve nerve and muscle tension.

2. To increase the child's experiences of enjoyment in play activities.

Social.—

1. To utilize the special opportunities that are present for the development of character traits such as fair play, courtesy, cooperation,

and sportsmanship, through the adjustment of individuals to group situations of a social nature.

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V. Objectives, Grades Five to Nine

PROMINENT CHARACTERISTICS

"*Age 13–15*
Rapid growth
Susceptible to fatigue
Moodiness and day dreaming quite common
Age of loyalty—of clubs, gangs, teams, etc.
Mutual sex attraction
Desire for excitement and adventure
Hero worship and susceptibility to adult leadership
Strong interest of girls in folk and dramatic dancing
Awkwardness
Powers of abstract reasoning developing
Emotions strong and not well under control
Strong desire to belong
Developing a sense of honor
Lack of understanding of adult points of view
Impatient with parental restraint
Narrowing interest to a few games rather than many"[6]

[6] E. W. Nixon and F. W. Cozens, *Op. Cit.*, pp. 116-117.

To serve these needs, the following activities are suggested: Tactics, Free Exercises of Remedial Type, Light Apparatus, Stunts, Heavy Apparatus, Pyramid Building, Dances, Mass Games of High Organization, Games of Skill, Achievement Standards, Sport Skills, Sports, and Antagonistic Sports.

TACTICS

Educational.—

1. To establish desirable mental-physical reactions (quick and accurate responses) insuring a state of readiness of groups in mass action. A safety element which pertains to school and life situations in the community.

Physiological.—

1. To cultivate a sense of rhythm.

2. To aid in the formation of correct motor habits and mechanical efficiency in the use of the body such as good carriage, bodily poise, weight adjustment, and conservation of energy.

3. To aid in the development of organic power, strength, stamina, and endurance. This is particularly related to movements at "double time" over a period of time and with frequent repetition.

Social.—

1. To develop the recognition of self as part of a group where the success of the maneuvers depends upon joint interest and individual responsibility.

FREE EXERCISES OF REMEDIAL TYPE

Educational.—

1. To develop a concept of good body mechanics and a favorable attitude towards maintaining this through self-direction.

Physiological.—

1. To prevent the development of postural defects in childhood and so preclude mal-alignment with resulting malfunction.

2. To remedy postural defects which already exist and to stay the momentum of the vicious cycle which follows once poor body mechanics has set in.

3. To facilitate the educative processes by bringing the body to a peak of maximal efficiency in which there is no leakage of energy due to poor body mechanics.

4. To prevent functional defects, fatigue posture, and slight curves from becoming structural deformities which may be amenable only to protracted immobilization or surgical intervention.

5. To prevent ptosis of the viscera and vital organs and to elevate ptotic organs by increased muscular tone.

6. To ease the burden on the heart and vascular system due to prolonged maintenance of the upright position, by the introduction of exercises in the horizontal position.

LIGHT APPARATUS—INDIAN CLUBS, WANDS

Educational.—

1. To provide an opportunity that will satisfy the strong natural desires of the child for rhythmical expression and assist in the development of esthetic standards, such as poise, grace, and harmony of motion.

Emotional.—

1. To progress from free exercises by adding interest in activities of a self-testing nature that challenge ability and thereby create a desire for physical expression and satisfaction in achievement.

Physiological.—

1. To aid in the acquisition of skills calling for a higher degree of neuro-muscular controls involving the use of both hands in the mastery of intricate movements.

2. To aid in the maintenance of good posture.

Social.—

1. To develop a group spirit and the recognition of group needs as well as the desire of the individuals to meet these needs.

STUNTS

Educational.—

1. To aid in the development of desirable personality traits which make for a higher type of "socially adjusted individual whose services afford a worthy contribution to the life of the community," i.e., originality, loyalty, fair play, initiative, perseverance, and courage.

2. To afford an opportunity to evaluate the individual's abilities and capacities in terms of leadership qualities. This implies an intelligent understanding of group needs in relation to the activities to be promoted and a spirit of helpfulness and service toward all.

3. To provide natural interests and play activities which meet the needs of small groups and will tend to be repeated in the after-school life of boys and girls.

Emotional-Social.—

To afford an opportunity for the individual through the joyous participation in the big-muscle activities of a play level type to test his own strength, skill, and creativeness in comparison to others thereby satisfying the innate desire for achievement.

2. To provide group situations which allow for wholesome self-expression and emotional control and aid in the social adjustment of the individual in respect to the rights and welfare of others.

Physiological.—

1. To further the development of fundamental neuro-muscular controls and organic power through the medium of interesting and wholesome recreative activities.

HEAVY APPARATUS—SIDE HORSE, PARALLEL BARS, ROPES, LADDERS

Educational.—

1. To aid in the development of desirable character traits, such as courage, determination, self-confidence, perseverance, and good fellowship, through the ability to control the body in challenging situations calling for quick and accurate mental-physical reactions.

2. To further the development of the rhythmic expression through the use of the body as a whole in movements calling for a higher degree of synchronization or time coordination.

Emotional-Social.—

1. To afford an opportunity for the child to test his own strength, skill, and originality in a group situation.

2. To participate in activities of a vigorous type, challenging in nature, resulting in satisfaction in accomplishment.

Physiological.—

1. To increase organic and nervous power through the medium of vigorous controlled big-muscle activities thereby:

   a) Developing increased strength, endurance, and vitality.

   b) Reducing accidents due to awkwardness, slow reactions, and lack of muscle tone by the development of a finely coordinated mechanism.

   c) "Developing mechanical efficiency in the use of the body by reducing fatigue and strain in motor activities of every day living."[7]

2. To satisfy strong natural desires by allowing the individual an opportunity to express fundamental instinct tendencies such as climbing, leaping, and vaulting, in types of activities that require bodily adjustment in terms of some obstacle to be surmounted.

Social.—

1. To develop personal qualifications pertaining to leadership or followship in relation to individual capacities and limitations in group situations.

PYRAMID BUILDING

Educational.—

1. To utilize the construction of human pyramids as an opportunity for a study of their source or origin as related to the recreational life of the peoples of Asia and the Levant, Arabia, China, and Japan, in correlation with project units.

2. To afford an opportunity for self-expression and creativeness and develop an appreciation of esthetic symmetry as related to simplicity in construction, solidity of foundation, and the harmonious relation of the parts to the whole.

[7] *A Manual of Physical Education*, Public Schools, Wisconsin, 1931.

3. To afford an opportunity for the recognition of individual differences as related to capacities, physical characteristics, and motor efficiency in team or group placement. "Each one has his niche for which he is especially fitted by reason of his physical and mental make-up."[8]

Emotional-Social.—

1. Through the cultivation of interests and satisfaction of enjoyment experienced in successful accomplishment in these skills as well as their adaptability to relatively small groups, to develop favorable attitudes toward continued participation in leisure-time activities.

Physiological-Educational.—

1. To satisfy instinctive urges to test one's physical capacities with others by placing the individual in challenging situations of difficulty calling for quick and accurate reactions in bodily adjustments to meet unexpected strains.

2. To induce a state of readiness and to aid in the development of the neuro-muscular mechanism and organic power.

Social.—

1. To aid in the development of desirable character traits, inasmuch as successful performance depends largely upon joint interest and mutual responsibility.

DANCES

Educational.—

1. To use the historic background in correlation with units of work of general education (history, geography, art, and music) relating to the project or activity method of instruction.

2. To afford an opportunity for the development of latent creative and artistic powers through the medium of harmony of motion and physical expression in relation to the arts of music and drama.

3. To utilize the stabilizing influence of the dance in the establishment of favorable social attitudes, ideals, and standards in the human relationships of the sexes.

Emotional-Social.—

1. To satisfy the instinctive primitive needs and desires of the individual for emotional and dramatic expression through the medium of rhythmic activity and music typical of the age and nationality.

2. To allow an opportunity for self-expression by means of group interests and feelings directed toward a common goal.

3. To experience satisfaction through the joy of accomplishment in rhythmic bodily movements of a social-recreative type and provide wholesome leisure-time interests and skills.

Physiological.—

1. To increase physical efficiency by promoting rhythmic efficiency resulting in harmony of muscular coordinations.

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[8] M. H. Macherey and J. N. Richards, *Pyramids Illustrated,* (New York: A. S. Barnes and Co., 1932).

2. To further normal growth and develop organic power and vigor through interesting and rhythmical bodily movements.

3. Through a general systematic exercise procedure, to acquire such physical characteristics as poise, grace of movement, and a sense of muscular balance, all of which have a direct bearing upon the formation of habits of good posture.

MASS GAMES OF HIGH ORGANIZATION

Educational.—

1. To broaden the child's knowledge and experiences in wholesome recreational activities of the play type which can be used in leisure-time.

Educational-Social.—

1. To aid in the development of desirable personality traits such as courage, initiative, perseverance, leadership, resourcefulness, and willingness to assume responsibility.

Physiological-Emotional.—

1. Through repetition of willed body movements of a vigorous type, to aid in the development of desirable neuro-muscular controls essential to successful performance and thereby satisfy an innate desire for achievement and accomplishment.

Physiological.—

1. To promote normal growth and develop maximal bodily efficiency through participation in vigorous activities conducive to increased organic power in terms of strength, endurance, and vitality.

Social-Emotional.—

1. To afford an opportunity to express fundamental instinct tendencies through participation in big-muscle activities natural to childhood.

2. To provide social situations under intelligent leadership and aid in the development of proper responses and emotional controls that will contribute ultimately to individual and group welfare.

INDIVIDUAL SPORTS: GOLF, ARCHERY, TENNIS, BOWLING

Educational.—

1. Through self-testing activities of this type, to afford an opportunity to the child to measure his progress in relation to his own development in an individual or a competitive situation.

Emotional.—

1. To develop an appreciation and interest in wholesome recreational activities that children and adults will use to their mutual advantage during leisure-time, both present and future.

2. Through the participation in interesting and wholesome recreational activities in the open air, to relieve tensions, to increase the indi-

vidual's experiences of enjoyment, and to enlarge his capacity for satisfaction and accomplishment.

Emotional-Social.—

1. To develop a choice of types of individual sports for leisure-time through the satisfactions gained and skills mastered during school hours under proper leadership.

Physiological.—

1. To further the development of fundamental motor skills to a higher degree of perfection tending toward proper and effective control of movements of rhythmic nature in relation to those specific game skills requiring finer muscular-mental coordinations.

Social.—

1. To bring about social adjustments through participation in group activities which place the individual in situations requiring responses involving the rights and welfare of others.

ACHIEVEMENT STANDARDS

Through the intelligent use of well organized batteries of tests based upon the many activities of physical education measured in terms of height, distance, time and accuracy, to:

Educational.—

1. Provide the children with an objective means of realizing their own progress in achievement of skill.

Emotional-Social.—

1. Stimulate a desire for acquisition of fundamental game skills and increased satisfaction in self-improvement.
2. Foster interests in wholesome sports that will carry into the leisure time of boys and girls.

Administrative.—

1. Discover pupil weaknesses in order that remedial work may be undertaken to correct faulty neuro-muscular controls.
2. Obtain data making possible a division of classes into homogeneous groups for competitive purposes.
3. Aid in course of study revision in order that teaching may be properly re-directed in terms of pupil needs.

Social-Educational.—

1. To promote individual adjustment to group needs in wholesome competition under wise leadership, resulting in the development of desirable character traits such as cooperation, good fellowship, self-confidence, and perseverance.
2. To afford the teacher an opportunity, through pupil participation in the many activities, to determine individual capacities, specific abilities, and personality characteristics conducive to leadership and intelligent followship.

Physiological.—

1. To promote normal growth and functional power through the intelligent selection and continued practice of activities that are motivated to give the child understanding and purpose.

SPORT SKILLS

Educational.—

1. To furnish a variety of sport activities in order that the child may determine his capacities and aptitudes and so aid him in the selection of specific interests for further development.

2. Through the development of a high degree of motor proficiency in skills which may be practiced in small groups, to increase interest and appreciation in wholesome physical education activities that may be carried on during leisure time.*

Emotional-Physiological.—

1. To aid in the acquisition of desirable neuro-muscular controls of a sport nature that will result in increased satisfaction and accomplishment in actual game situations.

Physiological.—

1. To further the development of the organic system through continued practice and participation in vigorous activities which allow an opportunity to express fundamental instinct tendencies such as walking, running, chasing, jumping, throwing, and catching.

Social.—

1. To develop a recognition of the contribution an individual may make toward the success of the group enterprise.

SPORTS

Administrative.—

1. To promote a balanced sport program in which all may take an active part in harmony with the physical capacities, skill, and experience of the various age levels of the players.

Educational.—

1. To aid in the development of healthful attitudes resulting in interest in bodily improvement by living up to the rules of training.

Educational-Emotional.—

1. Through the participation in group activities under wise and intelligent leadership to satisfy a fundamental urge for self-expression physically, mentally, and emotionally.

2. To direct emotional responses in such a manner as to develop right habits of thought and action and thus contribute to personality and character development.

* In their leisure time, children usually play in groups of three or four, hence, these sport techniques actually fulfill a need. The sports program requiring ten or more players for team groupings do not really function unless playgrounds, school yards, open lots, and parks are provided for this purpose.

Educational-Social.—

1. To afford an opportunity to determine and develop qualities of leadership by placing the individual in group situations where he will have to meet and solve unexpected problems calling for quick and accurate mental-physical reactions, straight thinking, sound judgment, and resourcefulness.

2. To provide for the testing of these individual skills in an actual playing situation where group effort contributes to successful outcomes.

Emotional.—

1. To modify individual behavior responses in playing situations in such a manner that group effort will effect the attainment of worthwhile goals and result in the acquisition of desirable attitudes and emotional stability.

Emotional-Physiological.—

1. Through increased satisfactions and joy experienced in participation in these activities, to motivate the perfection of neuro-muscular controls by infinite repetition in order that the individual may achieve a reasonable degree of success.

Physiological.—

1. To contribute directly to the development of organic power which is dependent upon increased muscular activity, through the vigorous nature of the sport program.

ANTAGONISTIC SPORTS: BOXING, WRESTLING, FENCING

Educational.—

1. Through knowledge and practice of rules and regulations, to inculcate fair play and sportsmanship.

2. To develop self-assurance and courage by use of the element of danger and challenge. In order to avoid physical danger, the emergency situation should prove valuable in the formation of mental qualities such as alertness, perseverance, judgment, and determination.

3. To aid in the development of good health through proper observance of training rules and respect for physical condition.

Emotional.—

1. To develop quick and accurate thinking to detect the weaknesses and strength of an opponent in various situations that arise during a bout and the maintenance of these factors over an indeterminate period of time, and thereby to temper the emotions of the individual.

2. Through the pleasure and joy of accomplishment experienced in antagonistic sports of a recreative type, to provide skills that will carry over for wise use of leisure time.

Physiological.—

1. Through the presence of sustained opposition, to promote organic development resulting in an increase of bodily efficiency through increased endurance and vitality.

2. To acquire physical efficiency and to develop neuro-muscular coordination and skill as a determining factor in meeting the challenge inherent in these activities.

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A Further Study of Tuttle's Test as a Means of Detecting Non-Compensated Organic Heart Lesions

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THE present study is a continuation of the problem begun by Miller and Tuttle (1933) and continued by Sievers (1935). A continuation of the study of the pulse-ratio test for detecting non-compensated organic heart lesions was demanded, since the nature of the study limits the number of cases available during a single year. Up to the present time only 35 cases have been reported. Obviously the data are too meager to justify final conclusions even though they appear to be quite conclusive.

Due to the fact that the method employed furnished a practical, safe, and apparently reliable means for detecting non-compensated hearts, a collection of sufficient data to make the use of the technique unquestionable is very desirable. The addition of more cases from time to time will finally yield sufficient data for definite conclusions, and will also serve as a verification of the methods and results reported by others.

In the first place, the study grew out of an investigation reported by Tuttle and Wells (1931), in which they established the fact that the increase in the rate of the normal heart, due to exercise, is directly proportional to the intensity of the exercise, and the form of the curve representing the relationship is rectilinear. This fact suggested the idea that if this principle held for only normal hearts, then a method was at hand for detecting non-compensated hearts.

Continuing the work begun by Miller and Tuttle (1933), Sievers (1935) collected data from 32 university freshmen who were reported as having abnormal hearts. The physician's report indicated 6 cases of functional murmurs, 16 cases of non-compensated organic heart lesions, 2 neurogenic cases, and 2 questionable cases.

The cases reported as abnormal were examined through the use of the technique which is described as follows:

The Technique.—The basis of the test is the pulse-ratio, which is found by dividing the total pulse for two minutes after a known amount of exercise by the resting pulse for one minute. The exercise employed

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consists of stepping on and off a stool 13 inches high at a measured rate for a period of one minute.

It has been pointed out in the investigations previously referred to that if two pulse-ratios and the amount of exercise responsible for each are known, then one can calculate, by means of the straight line formula,[1] the pulse-ratio for any given amount of exercise, provided that the response of the heart rate is directly proportional to the intensity of the exercise and the relationship is a straight line. Tuttle and Wells (1931) demonstrated this principle as follows: Eighteen stool steps were selected as a mild exercise which had proven to be sufficient to give a pulse-ratio of slightly more than 2.00. Forty steps were selected as a rather strenuous exercise capable of producing a pulse-ratio considerably higher than that resulting from 18 steps.

Now, in order to test the nature of the response of the normal heart to exercise of graded intensities a ratio corresponding to 25 steps was calculated and this compared with that actually obtained experimentally when 25 steps were actually performed.[2]

Suppose for purposes of illustration that 18 steps of a standard exercise produced a pulse-ratio of 2.14, and that 35 steps of the same exercise gave a ratio of 2.52; then, by calculation, 25 steps should give a pulse-ratio of 2.30. If the relationship which was assumed is true, then 25 steps actually performed should result in the same ratio as that calculated. The actual experiment gave a ratio of 2.31, a difference of .01 pulse-ratio.

It has been shown that the difference between calculated and experimental ratios up to .05 pulse-ratio can be accounted for by errors in counting the pulse rate.

The truth of the assumption as to the relation of the response of the normal heart to exercises of graded intensities has been conclusively proven, and is easily demonstrated.

Going a step farther, it was reasoned that the converse might be true, and thus the response of the non-compensated heart would not be directly proportional to the strenuousness of exercise, and the relationship would not be rectilinear.

As far as the investigations of Miller and Tuttle, and Sievers are concerned, the converse statement was found to be correct. The data showed that the compensated lesion cases and the neurogenic cases were normal on the basis of the pulse-ratio test. However, the non-

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[1] $$r = \frac{r_2 - r_1}{E_2 - E_1}(E - E_1) + r_1$$

r = any desired ratio; E = number of steps corresponding to r
r_1 = ratio corresponding to E_1; E_1 = less intense exercise in steps
r_2 = ratio corresponding to E_2; E^2 = more intense exercise in steps

[2] Instead of using the formula, the graphic method may be employed by plotting ratios on the ordinate and steps on the abscissa. By erecting ordinates from any point of exercise, the pulse-ratio can be found.

compensated organic lesion cases all proved to conform to the converse statement of the normal. It is worthy to note that a comparison of experimental and calculated pulse-ratios for non-compensated cases shows a difference which is definitely far beyond any error due to counting the pulse, and the relationship is definitely the converse of the normal.

The Scope of the Problem.—The investigation reported here is a repetition of previous experiments in an effort to provide additional heart cases in order to furnish additional data relative to the response of the non-compensated heart to exercises of graded intensities. The technique employed was sufficiently like that used by Sievers that a description other than that already given is not included.

The Data.—During the course of the medical examination at the University of Iowa in 1935-36, 37 cases were reported as being suspected of having some type of heart lesion. On the basis of this report, these cases were called back and re-examined by the physician and subjected, at the same time, to the pulse-ratio test for the determination of the nature of the response of the heart to exercise of graded intensities. The medical examination, when finally completed, showed that the group consisted of 20 normal cases, 14 non-compensated cases, and 3 questionable cases.

In order to make sure of the pulse-ratio results, each case was checked twice, a week or ten days apart. The results of both pulse-ratio examinations of all the groups are shown in the tables.

In order to avoid any prejudice on the part of either examiner, the results obtained by the physician were unknown by the pulse-ratio examiner, and vice versa. After the experiment was terminated, the results were compared and are discussed under the proper headings.

Group 1: The Normal Group.—This group consists of 20 cases. The data collected during two pulse-ratio examinations are shown in Table 1. In general, the data for both examinations show that on the basis of the pulse-ratio test, all of this group are normal. When the medical examination of these cases was compared with the pulse-ratio data, it was found to agree in every case.

Closer examination of the pulse-ratio data shows that for the first examination the difference between the calculated and experimental ratios in 5 cases was zero, in 3 cases .01, in 3 cases .02, in 2 cases .03, in 3 cases .05, in 1 case .06, and in 1 case .07 of a pulse-ratio. For the second examination the difference in 3 cases was zero, in 8 cases .01, in 4 cases .02, in 3 cases .03, in 1 case .04, and in 1 case .05 of a pulse-ratio. All of these differences fall within the normal range.

Obviously, the results of this part of the experiment are in conformity with the results obtained by others, and are further evidence that the response of the normal heart is directly proportional to the intensity of the exercise, and the relationship is rectilinear.

TABLE I

A Comparison of Calculated and Experimental Pulse-Ratio of Normal Heart Cases

Sub. No.	Normal Pulse	Light Ex.	Hvy. Ex.	P/R Lgt. Ex.	P/R Hvy. Ex.	Inter. Ex.	Exp. Ratio	Cal. Ratio	Diff.
				First Examination					
1	87	20	30	2.28	2.44	25	2.31	2.36	.05
2	85	20	40	2.18	2.89	30	2.56	2.54	.02
3	52	18	30	2.08	2.25	25	2.21	2.18	.03
4	98	15	30	2.18	2.41	20	2.26	2.26	.00
5	82	20	40	2.13	2.32	30	2.25	2.23	.02
6	54	18	35	2.24	2.50	25	2.30	2.35	.05
7	88	15	25	1.95	2.08	20	2.02	2.02	.00
8	95	15	30	2.07	2.26	20	2.20	2.13	.07
9	77	15	25	2.02	2.00	20	1.99	2.02	.03
10	94	15	35	2.17	2.62	25	2.34	2.40	.06
11	84	15	30	2.05	2.28	25	2.21	2.20	.01
12	84	15	35	2.08	2.53	25	2.36	2.31	.05
13	78	15	30	2.14	2.30	20	2.23	2.19	.04
14	73	18	35	2.14	2.52	25	2.31	2.30	.01
15	80	20	30	1.99	2.04	25	2.06	2.02	.04
16	76	18	33	2.10	2.47	25	2.27	2.27	.00
17	100	20	33	2.15	2.25	25	2.18	2.18	.00
18	92	20	30	2.06	2.28	25	2.20	2.18	.02
19	72	20	30	2.26	2.29	25	2.28	2.28	.00
20	78	20	30	2.08	2.27	25	2.17	2.18	.01
				Second Examination					
1	80	20	30	2.27	2.72	25	2.51	2.50	.01
2	83	20	40	2.17	2.96	30	2.56	2.57	.01
3	51	18	30	2.14	2.35	25	2.25	2.26	.01
4	89	15	30	2.05	2.83	20	2.31	2.31	.00
5	80	20	40	2.14	2.40	30	2.25	2.27	.02
6	50	18	35	2.18	2.58	25	2.36	2.34	.02
7	97	15	25	2.00	2.11	20	2.03	2.06	.03
8	100	15	30	2.05	2.27	20	2.16	2.12	.04
9	84	15	25	2.05	2.07	20	2.05	2.06	.01
10	82	15	35	2.19	2.83	25	2.52	2.51	.01
11	84	15	30	2.08	2.53	25	2.36	2.38	.02
12	78	15	35	2.26	2.63	25	2.45	2.45	.00
13	80	15	30	2.20	2.65	20	2.38	2.35	.03
14	84	18	35	2.10	2.50	25	2.32	2.27	.05
15	82	20	30	2.13	2.19	25	2.15	2.16	.01
16	73	18	33	2.11	2.49	25	2.30	2.29	.01
17	90	20	33	2.12	2.22	25	2.16	2.16	.00
18	89	20	30	2.16	2.31	25	2.27	2.24	.03
19	79	20	30	2.23	2.24	25	2.23	2.24	.01
20	78	20	30	2.08	2.27	25	2.16	2.18	.02

Group 2: Non-Compensated Organic Lesions.—Both the medical and pulse-ratio examinations placed 14 cases in this group. In fact, both types of examinations were in full agreement in each case. The data collected from this group are shown in Table II. An examination of the differences between the calculated and experimental ratios shows that in the first examination subject 3 gave a difference of only .04, while in the second examination the difference was .11. For subject 4 the difference was .07 for both examinations. In the case of subject 5 the first difference was .06 and the second .18. Subject 8 gave a difference of .25 on the first examination, but showed a difference of only .06 on his second examination.

TABLE II

A Comparison of Calculated and Experimental Pulse-Ratio of Non-Compensated Organic Lesion

Sub. No.	Normal Pulse	Light Ex.	Hvy. Ex.	P/R Lgt. Ex.	P/R Hvy. Ex.	Inter. Ex.	Exp. Ratio	Cal. Ratio	Diff.
				First Examination					
1	70	18	35	2.27	2.77	25	2.73	2.48	.25
2	64	15	30	2.15	2.56	20	2.43	2.29	.14
3	71	15	25	2.05	2.17	20	2.14	2.10	.04
4	80	15	25	2.34	2.52	20	2.50	2.43	.07
5	94	15	25	2.20	2.66	20	2.37	2.43	.06
6	68	15	30	1.91	2.25	20	2.13	2.02	.11
7	105	15	25	2.34	2.38	20	2.28	2.36	.08
8	94	15	35	2.04	2.60	25	2.57	2.32	.25
9	80	15	30	2.02	2.37	20	2.24	2.14	.10
10	68	18	33	2.28	3.06	25	2.76	2.64	.12
11	100	20	30	2.06	2.27	25	2.30	2.17	.13
12	96	15	25	2.02	2.27	20	2.32	2.13	.19
13	84	12	23	2.15	2.28	18	2.12	2.22	.10
14	85	18	30	2.00	2.43	25	2.12	2.25	.13
				Second Examination					
1	76	18	35	2.07	2.44	25	2.32	2.22	.10
2	73	15	30	2.15	2.46	20	2.50	2.25	.25
3	74	15	25	2.16	2.17	20	2.27	2.16	.11
4	80	15	25	2.27	2.50	20	2.32	2.39	.07
5	94	15	25	2.22	2.34	20	2.10	2.28	.18
6	90	15	30	1.73	1.96	20	1.91	1.81	.10
7	95	15	25	2.10	2.15	20	2.25	2.13	.12
8	82	15	35	2.34	2.90	25	2.56	2.62	.06
9	76	15	30	2.07	2.63	20	2.15	2.26	.11
10	70	18	33	2.20	2.98	25	2.44	2.56	.12
11	78	20	30	2.10	2.51	25	2.42	2.31	.11
12	105	15	25	2.05	2.23	20	2.24	2.14	.10
13	90	12	23	2.05	2.06	18	2.18	2.06	.12
14	95	18	30	2.05	2.58	25	2.07	2.36	.29

On the basis of the criteria used in the pulse-ratio technique, subject 4 might turn out to be normal. However, in any case where the difference is greater than .05, repeated examinations are given. The pulse-ratio examination is repeated as well as the medical examination until the case is definitely settled. It might be added that where the lesion is obscure and perhaps partly compensated, the difference is usually but slightly above the normal and close to the lower limit of the abnormal.

It is important to note that a case where the difference between the calculated and experimental pulse-ratios is slightly higher than the normal range (.05), almost always proves to be a partially compensated heart lesion case. It has also been observed that a partially compensated case may give a rather small difference on one occasion, but a rather large difference later. This seems to depend on the physical condition of the individual. A case in point is one observed by one of the investigators of this problem, where on some occasions the heart checked normal, while many times it showed a definite non-compensated lesion. The medical examination gave the same results. It seemed evident that the non-compensation was present only when the subject was in a poor physical condition, as shown by fatigue, nervousness, and sleeplessness.

A comparison of the medical findings with those of the pulse-ratio test showed that they were in complete accord in all fourteen of the non-compensated organic lesion cases.

The tendency of the data in Table II makes it necessary to give more than one examination in many cases. It is obvious that, on the basis of the data for both examinations, every non-compensated case was picked out. Although subject 4 was a mild case, yet his exercise was restricted by the physician, and his pulse-ratio differences were out of the normal range.

Group 3: Questionable Cases.—There are three subjects in this group. The results of the pulse-ratio examination are shown in Table III. On the basis of the pulse-ratio test, all of these cases have definite non-compensated organic lesions. However, the medical examination failed to reveal any definite non-compensated lesion. Although there was an apparent disagreement between the two examinations, the examining physician found that there were indications in his diagnosis of suspicious symptoms. Although the lesion was obscure, the final decision of the physician was that such a condition existed.

The Application and Use of the Technique.—As has already been stated, this investigation is a continuation of the problems already begun. As time goes on, it is the intention to amass sufficient data as fast as cases are available, so that practical use can be made of the technique without fear of error in conclusions. Although it has been pointed out that it is not intended to substitute the pulse-ratio test

for the medical examination, it should perhaps be repeated, that the idea in mind is to give the physical director a safe tool which is reliable. It should also be remembered that the pulse-ratio test only points out the existence of a non-compensated lesion, but tells nothing concerning its character. The procedure to follow after the discovery of non-compensated heart is to refer the case to the physician for diagnosis and treatment.

TABLE III

A Comparison of Calculated and Experimental Pulse-Ratio of Questionable Cases

Sub. No.	Normal Pulse	Light Ex.	Hvy. Ex.	P/R Lgt. Ex.	P/R Hvy. Ex.	Inter. Ex.	Exp. Ratio	Cal. Ratio	Diff.
				First Examination					
1	74	15	30	2.10	2.57	20	2.43	2.26	.17
2	72	15	35	2.01	2.53	25	2.12	2.27	.15
3	79	20	30	2.15	2.57	25	2.58	2.36	.22
				Second Examination					
1	78	15	30	2.18	2.42	20	2.24	2.26	.02
2	76	15	35	2.08	2.38	25	2.33	2.16	.17
3	58	20	30	2.39	2.82	25	2.45	2.61	.16

SUMMARY AND CONCLUSIONS

Data were collected from 37 cases which were reported to have organic heart lesions. On the basis of further medical examination, they were diagnosed and placed in groups as follows: Group 1 (normal), 20; Group 2 (non-compensated organic lesions), 14; and Group 3 (questionable), 3.

The groups were examined by means of the pulse-ratio test, and on the basis of the data collected complete agreement was found to exist with the medical examination.

The data presented are further evidence that the pulse-ratio technique is reliable for detecting non-compensated organic heart lesions.

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Further Observations on Tuttle's Test for Non-Compensated Heart Lesions

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THE pulse-ratio test has been recommended as a useful method for the detection of non-compensated heart lesions and has been used by us during the past year as a part of the special physical examination for women recommended to enroll in individual classes. Due to the fact that even in a rather large student body heart cases are the exception, the data substantiating the test as recommended are rather meager for final conclusions, even though there seems to be no question as to the reliability of the procedure.

The usefulness of the pulse-ratio test for detecting non-compensated hearts is sufficiently important to warrant a further piling up of data in order to remove all doubt as to its validity as a measure of heart defects where strenuous exercise is a part of the school program.

One of the problems confronting the physical director is the restriction of exercise because of heart disease. For the most part, those in charge of activities are not medically trained and are therefore unable, through physical examination, to detect those individuals who should be restricted in their exercise because of heart disease. This requires that the instructor must rely entirely on the physician. Although this is a safe procedure, much of the physician's time can be saved if the instructor has a method of selecting the cases which require the attention of the physician.

As we understand it, the pulse-ratio test does nothing more than point out heart cases which require restricted exercise. No claim has been made for it as a diagnostic procedure for determining the nature of the disease or the treatment of it. These are points which necessarily fall to the physician. It does, however, eliminate the examination of normal cases.

The Technique.—The technique has been described a number of times in the literature (Miller and Tuttle, 1933; Sievers, 1935; Shirley, 1935). Briefly, it consists of determining a pulse-ratio for a moderate exercise, usually 15 to 20 steps on a 13-inch stool. This is followed by the calculation of a pulse-ratio for a more strenuous exercise, usually 30 to 40 stool-steps. The subject then performs an intermediate exercise, usually 25 steps, and a third pulse-ratio is determined. The hypothesis back of the test is that if the subject is normal, the response of the heart to exercise will be directly proportional to the strenuousness

of the exercise. In order to prove the relationship, the pulse-ratio corresponding to the intermediate exercise is calculated and compared with that found experimentally. If the individual has a normal heart, the experimental and calculated ratios will be the same within limits of error in pulse counting. (This error allows for a difference of .05 pulse-ratio.) If the heart is non-compensated, the difference will be greater than .05 pulse-ratio, depending on the nature of the heart lesion.

The technique used in the investigation for securing data was exactly like that described by others pursuing similar research.

TABLE I

A Comparison of Calculated and Experimental Pulse-Ratios of Non-Compensated Heart Lesion Cases

Sub. No.	Normal Pulse	Light Ex. (No. Steps)	Hvy. Ex.	P/R Lt. Ex.	P/R Hvy. Ex.	Inter. Ex.	Exp. Ratio	Cal. Ratio	Diff.
1	76	15	30	2.42	2.74	18	2.63	2.48	.15
2	84	15	30	2.33	2.78	22	2.78	2.54	.24
3	76	15	30	2.30	2.43	36	3.10	2.48	.63
4	92	15	27	2.04	2.69	24	2.69	2.53	.16
5	76	15	36	2.31	2.81	23	2.38	2.50	.12
6	92	14	25	2.22	2.43	30	2.72	2.54	.18
7	90	15	30	2.37	2.77	24	2.73	2.61	.12
8	84	15	30	2.10	2.57	27	2.57	2.48	.09
9	92	18	25	2.46	2.85	19	2.61	2.51	.10
10	78	15	30	2.16	2.70	24	2.82	2.48	.34
11	86	15	30	2.14	2.32	36	2.59	2.39	.20
12	104	15	25	2.14	2.69	23	2.63	2.54	.09
13	92	15	30	2.48	2.72	16	2.41	2.50	.09
14	88	15	30	2.26	2.77	22	2.61	2.48	.13
15	84	15	30	2.35	2.85	20	2.54	2.45	.09
16	71	18	30	2.30	2.96	22	2.92	2.50	.42
17	90	15	30	1.98	2.44	31	2.70	2.47	.23
18	80	15	30	2.32	2.93	19	2.36	2.48	.12

Method of Checking the Technique.—The pulse-ratio test is such that it possesses a natural check of the technique. This is done by practicing on normal cases until the experimenter is able to check the calculated and experimental ratios within the limits of experimental error. As soon as one is able to check the test consistently, then it is a fair assumption that the technique has been mastered.

The Data.—During the course of the physical examinations, eighteen women were reported to have symptoms of non-compensated heart lesions. In order to prove further the validity of the pulse-ratio technique, each case was given the test. The data collected from the group are shown in Table I. It is of interest to note that in every case the

pulse-ratio test and medical examination agreed that there was a non-compensated lesion present and that exercise must be restricted.

Summary and Conclusions.—Experimental and calculated ratios for eighteen cases of non-compensated heart lesions as determined by the pulse-ratio technique were compared in order to throw further light on the validity of the pulse-ratio test as a means for detecting individuals whose exercise should be restricted.

The results of the experiment showed that the test as recommended agreed in every case with the medical examination and, as far as the cases examined are concerned, is valid for detecting non-compensated heart lesions.

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The Relation of Reaction Time, Speed, and Agility of Big Muscle Groups to Certain Sport Skills

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IT IS generally assumed that individuals skilled in sports differ in their motor responses from the unskilled. Certain problems follow with this assumption. For example, in what respect do the motor capacities of people skilled in sports differ from those of unskilled individuals who only attain low proficiency in sport activities?

Research attacking this problem of motor ability has been made within the last few years. Probably the most outstanding of these tests are Brace's Motor Ability Test, Cozens' Athletic Ability Test, and the Oregon Test. Although each of these tests has attacked the problem from a different angle, yet they are similar in that each test is an attempt to define general motor ability on the basis of certain specific skills, such as balance, eye-hand coordination, agility, strength, etc. Doubtless these are components of skilled motor reactions. It is difficult, however, to give practical application of the results of such tests to various sport activities, for with each sport either new elements or differing amounts of the same elements make it necessary to weight differently the component parts of the tests.

In this study the problem has been to discover, if possible by a deductive method, whether or not skill in sport activities is deducible into even very broad component parts.

The following three questions have given an approach to this problem:

Do individuals skilled in sports demonstrate a similarity (1) in speed of reaction, (2) in speed of running, and (3) in speed when action requiring dexterity of moving the entire body is necessary?

Do these "fundamentals" of reaction time, speed, and agility differ with the different sport activities?

How do individuals who rated very low or very high in Brace's Motor Ability Tests respond to these tests?

METHOD

In order to study this problem, three different groups of University of Michigan women were selected.

Group I.—This first group was selected on the basis of demonstrated skill in either tennis, golf, or archery. Only subjects were

selected who were considered by the instructor of each sport as outstanding University players in that particular sport. As it was necessary to limit the study, it was decided to use the above named three games for two reasons. First, because all three games come under the heading of individual sports; and, secondly, because in each of the three games the stimulus to which the player responds is a visual stimulus. As quality was the criterion for selection of subjects, the numbers were necessarily limited. In this group of subjects there were twenty-four tennis players, twelve golfers, and eleven archers.

Group II.—This second group was selected on the basis of demonstrated inability in physical education activities, i.e., the most noticeably uncoordinated. In most instances only those students judged as uncoordinated by several instructors were selected for this group. For example, a girl who failed to achieve average skill in tennis was not included in this group unless in all the other activities in which she participated she had also demonstrated skill far below the average. This group was limited to fourteen subjects.

Group III.—This third group was composed of those students who had made either the low score of 1, 2, 3, 4 or the high score of 8, 9, 10 on the first set of Brace's Motor Ability Tests. There were six subjects in the low group and eight subjects in the high group.

In order to study reaction time of large muscle groups, speed, and dexterity of moving the body (or "agility"), the following apparatus was used:

Two wood plates were attached solidly to the floor at a distance of 17′10″ apart. These plates were constructed of two pieces of wood 13.5″ by 4″ hinged together. A wire spring was placed in between the two pieces. The two floor plates were connected to an electro-magnet, making possible recording on a revolving kymograph. When pressure was applied to either plate a record of that pressure was made on the kymograph. These plates will be designated as Plate I (the starting plate), and Plate II.

A straight line was drawn between the two plates indicating the line of direction in which the subject was to run. Another line was drawn slightly to the right of this straight line indicating a circuitous path winding in and out around three high stools. This line extending from Plate II to Plate I was 27′10″ in length.

At the end of the room in full view of the subject, at a height of 4′7″, a small electric bulb backed by a reflector was fastened to a standard. The connection was so arranged that the operator standing at the side of the room could operate the light by a key which was out of the subject's sight. The light was also connected with an electro-magnet which made it possible to record each flash of the light on the kymograph.

Hundredths of seconds were recorded by an electric tuning fork tuned to the correct number of vibrations per second.

Seconds were also recorded. This was accomplished through a hookup to a central time clock, and an attachment made to a fourth electro-recording-magnet. This last attachment was made so as to facilitate the reading of the records.

The following directions were given verbally to each subject by the same operator:

DIRECTIONS

When you start running, from which foot do you push off? Answer: "Right" or "Left."

Stand with (right or left foot depending upon answer to above question) on the floor plate. Be sure to keep your weight on the other foot. Keep your foot on this plate until you see the light flash (demonstrate). As soon as you see the light flash, follow the arrows to the second floor plate running as fast as possible. Be sure to keep one foot on the second plate until the light flashes again. Then immediately turn and run, following the arrows around the stools and back to the first plate. Keeping your foot on this first plate, watch for the light and start over again.

Keep running this complete circuit until I tell you to stop.

Whenever the light flashes, move the foot which is in contact with the plate. Keep your weight on the other foot.

Keep your hands off any support while running.

If it apeared that the subject did not understand the directions, they were repeated. The subjects were then given a practice trial to make sure that their understanding of the directions was correct.

In giving the test, no attempt was made to give the light stimulus at regular intervals. This was done purposely as it was felt that this would more nearly represent the stimulus which comes in a game situation.

A completed record then gave in seconds and one-hundredths of seconds:

1. The time when the light flashed, and the time when the subject left the floor plate. These two readings made it possible to determine the subject's reaction-time to a visual stimulus.

2. The time it took to run from Plate I to Plate II, or speed.

3. The time it took to run the circuitous path from Plate II back to Plate I, or "agility."

Two complete records were always made of each subject and as many as four were obtained on some subjects.

A subsequent test was also given each subject to test her arm reaction time. For this test, the subject sat on the floor near Plate I in a position to see the flash of the light and so that she could place her right hand (or left hand if the subject were left handed) comfortably

on the plate. Directions for this test were also given verbally by the same operator. They were as follows:

When the light flashes, push down on this plate. When the next light flashes lift your hand up, the next light push down, etc. With every flash of the light, then, you will make only one movement, either pushing down or lifting the hand. Your hand must always remain in contact with the plate.

The subject was then given several practice trials to make sure that she understood directions.

The record for the arm test included in hundredths of seconds the reaction time of the subject, first in making contact by pressure, and second by release of pressure. At least five reaction times were obtained for each subject and in some cases as many as fourteen.

In each instance the subjects were most cooperative and interested in the experiment.

RESULTS

1. The data obtained by comparing the reaction time, speed, and agility of the three groups tested (the skilled, the unskilled, and Brace's Motor Ability group) are given in Table I.

TABLE I

TABLE SHOWING MEANS IN SECONDS FOR (1) REACTION TIME, (2) SPEED, AND (3) AGILITY IN THE THREE GROUPS STUDIED

Tests	Skilled Group				Unskilled Group	Brace's Motor Ability Group	
	Tennis (24)	Golf (12)	Archery (11)	Total (47)	(14)	High Score (8)	Low Score (6)*
Reaction time. (legs)	.5061	.5366	.6042	.5350	.6490	.5322	.5453
Reaction time. (arms)	.2415	.2626	.2509	.2489	.2938	.2485	.2521
Speed	1.853	1.984	1.903	1.899	2.292	1.776	2.153
Agility	3.970	4.263	4.032	4.053	4.771	3.867	4.607

* Numbers in each group who took the test.

2. The average range of scores for the various groups are given in Table II.

3. Because the numbers examined in each group were so few, the "reliability of the difference of the means" was computed on the reaction time of the groups for the skilled and unskilled subjects according to the formula

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

This was found to be $t = 6.79$.

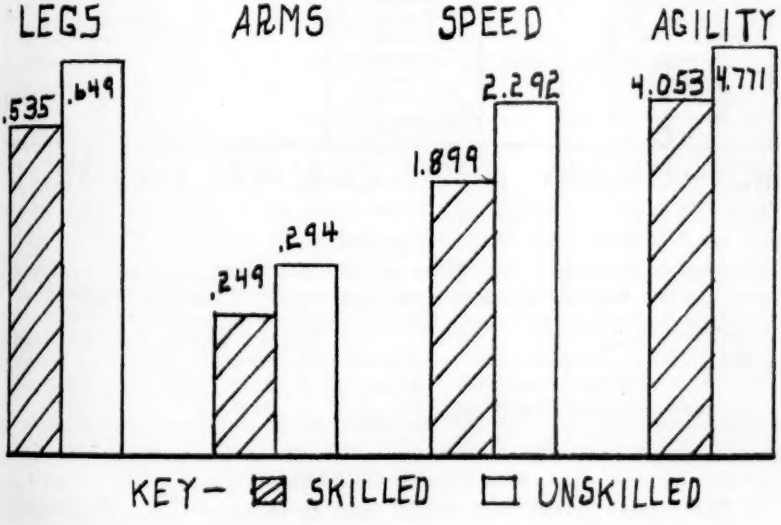
TABLE II

AVERAGE RANGE OF SCORES IN SECONDS FOR EACH GROUP STUDIED

	Skilled Group				Unskilled Group	Brace's Motor Ability Group	
Tests	Tennis	Golf	Archery	Total		High Score	Low Score
Reaction time. (legs)	.2287	.2666	.2663	.2472	.3985	.2638	.1820
Reaction time. (arms)	.1822	.2017	.1709	.1845	.2514	.1537	.1300
Speed	.4254	.2133	.3000	.3419	.2462	.4212	.3500
Agility	.3008	.3092	.2609	.2935	.5115	.4075	.4283

TABLE III

HISTOGRAM INDICATING THE MEANS IN SECONDS FOR REACTION TIMES (ARMS AND LEGS), SPEED, AND AGILITY OF THE SKILLED AND UNSKILLED GROUPS



4. It will be remembered that reaction time of the arms was made in two ways—first, by a "push-down" on the floor plate to make contact, and second, by a release of pressure to break the contact. The results show that the mean reaction time for the "push-downs" was .1435 seconds and for the releases .2237 seconds.

5. Comparisons can be made of the mean reaction times for the skilled and unskilled groups from Table I.

6. Comparisons of the first reaction times of the legs with subsequent reaction times are given in Table V.

7. By examining Table I, comparisons can be made of the scores made by the subjects making high and low scores on Brace's Motor Ability Test. These scores and the scores made by the skilled and unskilled groups should also be compared.

TABLE IV

HISTOGRAM COMPARING MEANS IN SECONDS FOR THE REACTION TIME OF LEGS, SPEED, AND AGILITY FOR TENNIS, GOLF, AND ARCHERY PLAYERS WITH THE UNSKILLED GROUP

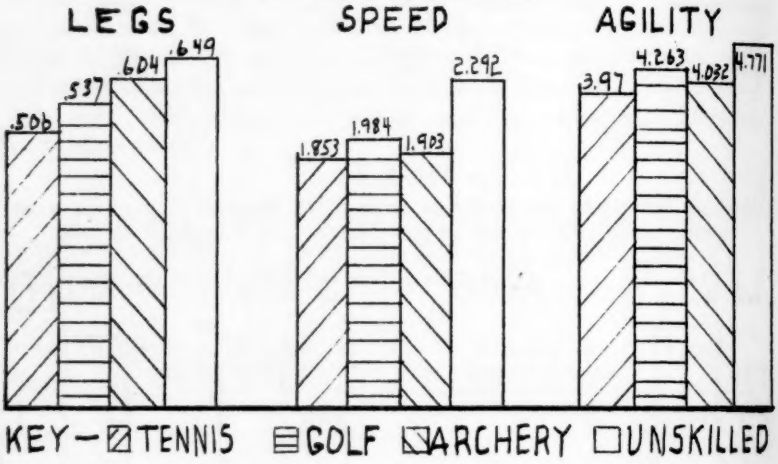


TABLE V

AVERAGES FOR FIRST REACTION TIMES OF LEGS IN SECONDS, AND FOR ALL SUBSEQUENT REACTION TIMES FOR THE SKILLED AND UNSKILLED GROUPS

Tests	Skilled Group	Unskilled Group
First Reaction Time Test	.5523	.6635
Subsequent Reaction Time Tests	.5319	.7592

DISCUSSION OF RESULTS

The results of this test would tend to indicate that the elements which were included, i.e., reaction time, speed, and agility, seem to be fundamental to skill in certain sport activities. If skill in sport is an indication of general motor ability, then it would seem that these elements are fundamental to a valid measurement of motor ability.

As shown in the results, the reliability of the difference t was equal to 6.79. The significance of this difference in the observed means is more than sufficient to justify our comparisons made between skilled and unskilled groups. It is inconceivable that this difference is not significant, since the higher the value of t, the more significant the figures. When one realizes that in this study if t had only the value of 5, there

would be only one chance in 10,000 that these differences in means were not significant, and with t representing 6.79 as it actually does in this study, then the reliability is well demonstrated.

The skilled group shows a significant difference from the unskilled group in reaction time of large muscle groups, speed of running, and in speed when action requiring dexterity of moving the body is necessary.

In Table II it can be seen that in reaction time and agility the average range of scores for the unskilled group is much greater than that for the skilled group. Does the skilled individual eliminate in the learning process much that is unnecessary in fast and agile movements of the body, or is this type of reaction time an innate characteristic?

Another difference between the skilled and unskilled is indicated in Table V. The skilled individuals show greater stability in reaction time regardless of the condition under which the stimulus is given. The average reaction time on the first stimulus for the unskilled is faster than that for the average of all subsequent reaction times.

It is interesting to note that within the skilled group (Tables I and IV), differences occur according to the type of activity: tennis, the game requiring rapid coordination of the entire body, shows faster reaction time, speed, and agility than the more stationary sports such as golf and archery.

The skilled and unskilled groups show only a slight difference in their reaction time of arms, the unskilled being .05 seconds slower.

In comparing the reaction time of large muscle groups with analogous movements of the arms within the skilled group, it was found that the reaction time of the arms was faster by a difference of .286 seconds. In the unskilled group the difference was .3552 seconds. No doubt this difference of reaction time of arms and legs is to be expected because of the differences in length of nerve pathways from the brain to the arms and legs, and also because of the greater number of movements constantly made with the hands.

In making several case studies of the subjects, we found that it does not necessarily follow that a girl who has a fast reaction time of legs will have a correspondingly fast reaction time of arms, or vice versa.

In comparing the results obtained from this test and those made with Brace's Motor Ability Test No. 1, our results are too meager to draw conclusions as the number of subjects was only fourteen. The study does indicate that in speed and agility the individuals who made high scores on the Brace Test were significantly faster than those individuals making a low score. In reaction time the difference was negligible. Probably one of the most interesting facts as far as this study is concerned, however, is a comparison of our unskilled group with the subjects making a low score on the Brace Test. In every instance our unskilled group was significantly slower.

CONCLUSIONS

1. It seems possible that even with this small number of subjects and with the small number of trials, that significant differences between skilled and unskilled individuals can be determined by this "S-A-R" (Speed, Agility, and Reaction Time) test.

2. Results of this study indicate that within the skilled group different levels of speed are found to exist, depending upon the sport in which the individual is proficient. Apparently, the more active the sport, the faster the speed in each element of the "S-A-R" test.

STUDY II. EFFECT OF TRAINING

In consideration of the above results, the question arises as to what extent *training* may affect scores made on the S-A-R test.

In order to throw some light on this problem, the following experimental approach was used. Twenty-six women were selected from the University physical education classes who had had no previous training in the sport for which they were registered. Because of the problem of selectivity the number of subjects was somewhat limited.

In order to make this study comparable to the previous study, individuals were selected only from the tennis, golf, and archery classes—the division being ten tennis subjects, eight golf subjects, and eight archery subjects. The test was given at the beginning of the season's activities and repeated at the end of the seven week instructional period. During this period each student was exposed to fourteen hours of class activity. The activity periods included instruction in fundamentals and an opportunity for playing in the game situation. No attempt was made to restrict activities outside of class periods. However, in checking on outside participation, three of the tennis subjects had played tennis outside of class hours. Case studies have been made of these three subjects and will be included in the discussion of results.

A controlled group composed of eight students who were not participating in any sport were similarly tested at the beginning and end of a seven-week period. Again, the number of subjects was necessarily limited because of the difficulty in obtaining students who had not received any training in physical education activities while at this University, and who were not engaged in any form of athletics during the experimental period.

A third group consisting of five subjects, acting also as a control group, was given the test on two consecutive days. With this group, such factors as time of day, amount of exercise, and rest were carefully controlled. This is the beginning of an attempt to determine the reliability of the test. Reliability coefficients for this group are not included in the results because of the small number of subjects. This problem will be included in further experimentation. In referring to this group it will be designated as Control Group 2.

In administering the tests the same technique was used as in the previous study.

RESULTS

Table VI gives the differences between the pre-test and post-test scores for the experimental and control groups.

TABLE VI

TABLE INDICATING DIFFERENCES IN MEAN SCORES, IN SECONDS, MADE ON THE PRE-TESTS AND POST-TESTS BY EXPERIMENTAL AND CONTROL GROUPS*

Groups	Reaction Time	Speed	Agility
Control Group 2	—.012	+.094	+.09
Control Group	—.081	—.062	+.009
Experimental Group	—.035	+.03	—.053
Tennis	—.036	+.16	—.127
Golf	—.046	+.021	—.136
Archery	—.025	—.091	+.087

* Minus signs denote faster time on the post-test.

In order to determine whether the differences in the means of the reaction-time scores on the pre-tests and post-tests (as indicated in Table VI) were significant differences, the "Reliability of the Difference of the Means" (t) was computed by the following formula:

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2} - 2 r_{12} \sigma_{M_1} \sigma_{M_2}}}$$

This "Reliability of the Difference of the Means" was found to be 1.91. Although this difference seems to be slightly significant, one cannot attribute this significance to the seven week instructional period because the control group showed even greater diffierences in the pre-test and post-test scores (—.081 seconds).

There are greater differences in means for speed and agility. These differences are not significant since scoring of the two elements involves seconds instead of parts of seconds as on the scores for reaction time tests.

DISCUSSION OF RESULTS

The purpose of this study was to determine whether a seven week instructional period in tennis, golf, or archery would affect the predetermined "fundamentals" of reaction time, speed, and agility. It is apparent from the results shown in Table VI and by the computation of the "Reliability of the Difference of the Means," that training given the experimental group had no significant effect on the S-A-R test scores. This conclusion seems to be further verified by the fact that scores within the control group showed differences comparable to differences in scores within the experimental group.

It would be interesting to determine in this connection to what extent the scores would be affected (1) by an intensive period of train-

ing, and (2) by participation in physical education activities for one year.

CONCLUSION

Training of individuals in tennis, golf, or archery classes, meeting two hours a week for seven weeks, did not significantly affect scores on the S-A-R test. Further experimentation on these problems is being carried on.

NOTE: We wish to take this opportunity to express our appreciation to Dr. Robert Gesell, Professor of Physiology, and to Dr. Charles Brassfield, for the advice and assistance given in this study.

Knowledge and Achievement Tests in Girls' Basketball on the Senior High School Level

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INTRODUCTION

THIS study is intended for teachers of physical education and for girls in senior high schools who wish to have some objective mark or goal which will serve as a means for motivation of teaching and for measurement of that teaching.

The data which were secured from four different parts of the nation were tabulated and interpreted. These data may be used, as set up by the computation, in assigning school marks or in measuring by grades.

RELATED INVESTIGATIONS

There have been very few experiments made in the field of performance for girls in both skill and knowledge of the senior high school level. Most of the tests given have been comprehensive ones to cover various techniques of the entire program. Examples of this type of experiment are the California Decathlon,[5]* Athletic Badge Tests for Girls,[4] National Physical Achievement Standards Committee,[11] and Motor Ability Tests of the American Physical Education Association.[3] In 1934 a very excellent study of ability and achievement in college women's basketball was presented as a master's thesis by Genevieve Young and Helen Moser to the University of California. It was later printed in the Research Quarterly.[14]

METHODS OF PROCEDURE AND SOURCES OF DATA

Five events were originally chosen as measuring the skills offered to girls of the senior high school level in basketball, namely: jump and reach, pass and catch for speed, bounce over a six foot area, accuracy throw for goal, and a pivot, bounce, and toss for goal.

Establishment of Validity and Reliability.—The validity of the test items was established by sending letters to some fifty-four women who

This study presents in condensed form the content of a thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Physical Education in the Graduate Division of the University of Southern California, Los Angeles, California.

* Figures refer to bibliography at end of article.

are well versed in the theory and technique of basketball for girls. They were asked to criticize the test severely and to offer any opinions conducive to the forming of better tests which they might have. These letters were supplemented by a questionnaire asking specific questions.

The replies were carefully studied and compiled into a table from which the tests, both knowledge and skill, were rearranged and changed to conform to accepted standards. To validate the test more completely, fifty matriculating freshman women at the University of Southern California were subjected to it. From the data obtained, the tests were again improved, mimeographed in their final form, and sent out.

On the basis of the revision procedures indicated previously, the test was modified to meet the following criteria: (1) measuring fundamental elements of the trait, (2) brevity of reaction, (3) economy of time and effort, (4) use with group or with individual, (5) test items should produce no undistributed scores, (6) uniformity of test instructions, and (7) establishment of validity and reliability.

As a result, the revised skill test included:*

1. Bounce over six foot area, 5 trials
2. Jump and reach, 5 trials
3. Pass and catch against wall (behind 8 foot line), 2 trials (30 seconds each)
4. Accuracy throw for goal, 10 trials
5. Pivot, bounce, and throw for goal, 10 trials

The revised knowledge test included:

1. Fifty true-false questions
2. Fifteen completion questions
3. Twenty best answer questions
4. Fifteen pictorial questions

INTERPRETATIONS OF DATA FROM THE SKILL TEST

The data constituting the basis for construction of the following scales were the performance records of a thousand high school girls in educational institutions over the United States. One thousand cases for each of the five skill events were available, and these were utilized in developing the scales in each event.

The best records of each pupil in each event, where more than one trial was necessary to determine the actual skill, were tabulated. The means and standard deviations of each distribution were then computed and formed the basis for the construction of the achievement scales.

INTERPRETATIONS OF THE MEANS AND STANDARD DEVIATIONS

Skill Test One.—"Bounce Over Six Foot Area" was found to have a mean of 4.8. The range of scores was of necessity limited from 1–5

* Detailed description of the tests is included in the Appendix.

since only five trials were allowed. The mean in this instance was so very high that it rendered the event useless as a measure of skill and therefore was discarded. No further computations were made for this event.

Skill Test Two.—"Passing and Catching" had a mean of 21.9, with a standard deviation of 6.16. The better score of two trials was chosen in each case since the improvement factor definitely enters with the second trial, and the best effort of the student was wanted. The range of scores varied from 2–42.

Skill Test Three.—"Jump and Reach" was found to have a mean of 13.2, with a range of from 3–23 inclusive. The standard deviation was 3.35. The central tendency of 13.2 indicated that the majority of high school girls have considerable spring. In this event the best of five trials was used.

In a recent study, the mean of 400 college women was found to be 13.3.[6]

Skill Test Four.—"Throw for Goal" had a mean of 5.3, with scores ranging from 0–10. In this instance the entire range of possible scores was covered. Ten trials from ten designated angles on the floor limited the range. The standard deviation was 2.098.

Skill Test Five.—"Pivot, Bounce, and Shoot" had a mean of 22.2, with a standard deviation of 5.75. The score ranged from 1–30. The high mean would seem to indicate that although the majority could pivot and bounce correctly, they failed to score a third point on each trial because of a poor shot for basket. Since this was true it would have been better to have scored one point for every successful bounce, and three points for every successful basket shot, with a possible total of five points for every trial and fifty points for ten trials. With this in mind the scoring for 620 cases was changed to conform to this idea. The mean for the 620 cases was found to be 30.3 with a range of from 0–50. This latter mean was used in the construction of the scale.

CONSTRUCTION OF THE SCALES

Since Cozens and Neilson are recognized authorities in the field of testing and measuring in physical education, their method of building achievement scales was accepted.[12] All of the scales were set up to conform to their standard of three standard deviations above the mean for 100, and three standard deviations below the mean for 0, with mean itself corresponding to a score of 50. Increments for each score increase were computed by multiplying the standard deviation of each event by three and dividing the total by fifty.

Each scale, including that for the knowledge test, was set up in this fashion with the result that a given score on one scale is comparable to the same score on another scale. The scores for all four events

may be added and averaged to find the total achievement of an individual.

Special Treatment of Data.—The nature of one event was such that it could not be treated in the same manner as the others. The skewness of the "Pivot, Bounce, and Shoot" was positive to the extent that some means of scaling other than the one used for the rest of the events had to be employed. The size of the standard deviation was such that the scale, if arranged as it was for the other events, would not correspond in distribution to the others. For this reason a method suggested by Neilson and Cozens was adopted.[12] The range of scores, both above and below the mean, was subtracted from the mean and divided by three. The resulting figures were then treated in the same manner as in previous computations for determining the size of the increment. With the employment of this method the interval of the scale scores varies above and below the mean. However, the entire range of performance is covered.

SCORING THE TEST ITEMS

With the T-scale constructed, finding the percentile equivalents of the four given test item scores was the next consideration. Scale scores and their equivalents are in Table I. To do this, find the score an individual has made on a skill item under the named column. Look to the nearer scale score column and transfer the skill score to the scale score. Find the scale score for all four skill items, add, and divide by four. This is the pupil's score for the basketball skill test.

Relative position of achievement scores.—That a percentile evaluation may be given, so a teacher may know whether a pupil stands in the upper or lower 5 or 10 per cent, Table II has been prepared.

In all teaching, the knowledge of a pupil's score in relation to the scores of the rest of the group is necessary. For this reason a table has been prepared for the purpose. If a pupil scores 80 on the combined skill events, we find, on looking at the table, that she is in the upper 5 per cent. If she scores 56, she is in the middle 50 per cent.

INTERPRETATIONS OF DATA FROM KNOWLEDGE TEST

The knowledge test, as has been previously stated, contained fifty true-false, fifteen completion, twenty best answer, and fifteen pictorial questions making a total of one hundred questions covering rules, team play, strategy, fundamental techniques, and position of players with their duties. This test was administered to the same thousand cases who took the skill test.

INTERPRETATIONS OF THE MEAN AND STANDARD DEVIATION

The score from the knowledge test had a range of from 33–100, with a mean of 69.9. From this rather high mean, one would assume

TABLE I
ACHIEVEMENT SCALE SCORES

Scale	Pass and Catch	Jump and Reach	Throw for Goal	Pivot, Bounce, and Shoot	Knowledge Test
100			10	50	100
99					99
98				49	
97					98
96				48	
95					97
94					96
93				47	
92					95
91				46	
90	42	23	9		94
89				45	93
88	41	22.5			
87					92
86	40	22		44	91
85					
84	39	21.5			90
83				43	
82	38	21			89
81					88
80	37	20.5	8	42	
79					87
78	36	20		41	86
77					
76	35	19.5		40	85
75					
74	34	19			84
73				39	83
72	33	18.5			
71					82
70	32	18	7	38	
69					81
68	31	17.5		37	80
67					
66	30	17		36	79
65					78
64	29	16.5			
63				35	77
62	28	16			
61				34	76
60	27	15.5	6		75
59				33	74
58	26	15			
57					73
56	25	14.5		32	
55					72
54	24	14			
53				31	71
52	23	13.5			
51					

TABLE I (Continued)
ACHIEVEMENT SCALE SCORES

Scale	Pass and Catch	Jump and Reach	Throw for Goal	Pivot, Bounce, and Shoot	Knowledge Test
50	22	13	5	30	70
49				29	69
48	21	12.5			68
47				28	67
46	20	12			
45				27	66
44	19	11.5			65
43				26	64
42	18	11		25	
41					63
40	17	10.5	4	24	62
39					61
38	16	10		23	
37					60
36	15	9.5		22	59
35					58
34	14	9		21	
33					57
32	13	8.5		20	56
31				19	55
30	12	8	3		
29				18	54
28	11	7.5			53
27				17	52
26	10	7			
25				16	51
24	9	6.5			50
23				15	49
22	8	6			
21				14	48
20	7	5.5	2		47
19				13	46
18	6	5		12	
17					45
16	5	4.5		11	44
15					43
14	4	4		10	
13					42
12	3	3.5		9	41
11					40
10	2	3	1	8	
9					39
8	1	2.5		7	38
7					37
6		2		6	
5					36
4		1.5		5	35
3				4	34
2		1			
1				3	33

that the test was too easy; but on close inspection of the scores in relation to the questions asked, one deducts that the test contained too many questions which were either too difficult or too simple. Not enough questions were of average difficulty. The standard deviation was 9.48.

TABLE II

SCALE SCORES IN RELATION TO A NORMAL DISTRIBUTION—SKILL TEST

78 or above, Upper 1 per cent	Below 44, Lower one-third
71 or above, Upper 5 per cent	Below 42, Lower 25 per cent
65 or above, Upper 10 per cent	Below 41, Lower 20 per cent
59 or above, Upper 20 per cent	Below 37, Lower 10 per cent
57 or above, Upper 25 per cent	Below 33, Lower 5 per cent
54 or above, Upper one-third	Below 26, Lower 1 per cent
From 41 to 57, Middle 50 per cent	

TABLE III

SCALE SCORES IN RELATION TO NORMAL DISTRIBUTION—KNOWLEDGE TEST

86 or above, Upper 1 per cent	Below 44, Lower one-third
75 or above, Upper 5 per cent	Below 41, Lower 25 per cent
68 or above, Upper 10 per cent	Below 39, Lower 20 per cent
62 or above, Upper 20 per cent	Below 31, Lower 10 per cent
59 or above, Upper 25 per cent	Below 21, Lower 5 per cent
56 or above, Upper one-third	Below 7, Lower 1 per cent
From 40 to 59, Middle 50 per cent	

SCORING THE TEST ITEMS

To find the percentile equivalents of a given test score, look on a horizontal line to the scale score column and transfer the knowledge test score to the scale score.* This is the pupil's score for the knowledge test.

Relative Position of Achievement Scores.—In nearly all teaching, the knowledge of a given pupil's score in relation to the scores of the rest of the group is necessary. For this reason a table was prepared of use to the teacher for purposes of evaluation.*

CONCLUSIONS AND RECOMMENDATIONS

This study is intended for teachers of physical education who wish to have some objective mark or goal which will serve as a means for motivation of teaching and for measurement of that teaching in the sport of basketball for girls in the senior high school.

The need for solution of this problem is evident when one realizes that basketball for girls, in one form or another, is taught in practically all of the junior and senior high schools throughout the United States. It was the attempt of this paper to establish a standard for evaluating the progression of a pupil for the two following reasons: 1. At no time

* See Tables V and VI.

has a teacher been able to measure the efficiency of her teaching. With a standard, she can ascertain the weaknesses of her own instruction and provide means of remedying them. 2. The pupils can be motivated to a greater degree of efficiency in their class work in basketball.

Pass and Catch.—If nearly all her students are average or lower in the "Pass and Catch," the teacher may justly surmise that by increasing their speed and accuracy in passing and catching she will raise the level of skill in her basketball groups. They will undoubtedly play a better game as a result of having increased their skill in passing and catching quickly and accurately.

Several leaders in physical education, more specifically in basketball teaching, have condemned the practice of having pupils pass and catch a basketball against the wall on the theory that it is not a game situation. But does not the tennis player practice by the hour against a backboard or wall, and improve thereby? And does not the sprinter practice day after day running against no one?

Throw for Goal.—Of two individuals' scores, a teacher may find that *A* scored eight baskets on her "Throw for Goal," but only three on "Pivot, Bounce, and Shoot," while *B* scored three baskets on "Throw for Goal" and eight baskets on "Pivot, Bounce, and Shoot." *B* is therefore the better player, not only from the standpoint of shooting baskets, but from the standpoint of accuracy in throwing while moving. *A* needs to improve her accuracy to the extent of being able to raise her achievement in basket shooting while moving.

B is the more valuable player from another standpoint. If there are already a sufficient number of forwards on a team, *B* should be able to play a better game in any position than *A* because of her better ability to throw with accuracy while moving.

It is the contention of the investigator that no separate tests need be devised for the different positions on a basketball team. This is contrary to the opinion of many teachers of basketball for girls. Basket shooting, as a means of scoring in a game, is one thing, but basket shooting as a self-testing event for accuracy is another. A player, no matter what position she plays, needs accuracy in throwing a basketball. It makes no difference whether she throws the ball at a hoop or into the hands of another player, the need for an accurate throw is the same.

Pivot, Bounce, and Shoot.—It would seem, from inspection of the scores, that most girls made more baskets on the "Throw for Goal" than on the "Pivot, Bounce, and Shoot." Therefore, most girls need added instruction and practice in shooting while moving, that is, at the termination of a juggle, bounce, or pivot.

Jump and Reach.—It is amazing to know that the average senior high school girl is able to jump twelve inches in the air without a run. This event showed very graphically the fallacy that extremely tall girls

make good jumping centers. A shorter girl, with more spring, is not only able to outjump the taller girl, but is able to move about the court more quickly and with greater ease.

Knowledge Test.—The administration of a knowledge test is always worth while in that the student must make a decision for himself, in black and white, with no help from his team mates. This is in itself conducive to independent thinking, which is an asset on the basketball court. In addition, a knowledge test is a stimulant to know more, in order to avoid making the same mistakes on a later test or in the game.

If the tests are administered and the scales used, not as an independent grading system, but as a colligation to subjective grading of pupils in actual game situations, the tests will be of worth. Through them the instructors can determine what a pupil is capable of actually achieving in terms of number of inches in height jumped, or number of baskets made out of a specific number of trials.

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KNOWLEDGE AND ACHIEVEMENT TEST IN GIRLS BASKETBALL ON THE SENIOR HIGH SCHOOL LEVEL

SKILL TEST

Technique of Administering Test.—Everyone to be tested should be in athletic costume with appropriate shoes. Assemble the group and divide into squads of ten with a leader or assistant in charge. The leader is given the score card, and as each girl steps up to take her turn, she gives her name, grade, and age to the leader who writes it in the blank space.

As the groups finish one portion of the test, they rotate to the next and so on until all groups have had an opportunity to complete the entire test. The pupils should be told to recover the balls as quickly as possible and if those who are waiting for turns could be delegated to recover balls, much time could be saved. This test can be given to approximately 40–50 girls in about 45 minutes. One or two preliminary trials may be allowed if time permits.

A simplified explanation of each of the tests is given the students prior to their attempting the particular test.

1. *Bounce.*—In the test for bouncing, two parallel lines six feet apart are needed.

The individual taking the test stands outside the six foot area with ball in hand. Directly in front of her stands an assistant (approximately the same height as the one taking the test), with arms stretched sideward shoulder height. The assistant stands motionless. At the signal, the player bounces the ball around opponent's body and recovers it beyond the six foot area. Five trials are allowed.

2. *Passing and Catching.*—In the test for passing and catching, a wall space twelve feet wide by six feet high and three feet from the floor or ground is needed. A line eight feet out from the wall should also be drawn. The assistant must be provided with a stop watch.

The player must stand outside the eight foot line and pass into the area marked on the wall and catch the ball on the rebound. Two trials of 30 seconds each are given. A ball bounding on the line on the wall is good. Stepping over the line, catching the ball after it has bounced, passing outside the area, dropping the ball, are considered failures on those particular passes in which any of the preceding faults occur. Any style pass may be used.

As the ball will travel rather quickly, just the total number of correct passes and catches should be recorded. If the ball is in the air when time is up that pass and catch should not be included in the total number.

3. *Jumping.*—In the test for jumping, several pieces of chalk about an inch long, one wall, and a yardstick are required.

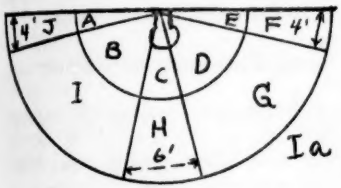
The player holds a piece of chalk parallel with her forefinger so that the end is seen just beyond her finger tip. Facing the wall, feet flat on the floor, she reaches as high as possible and marks on the wall with her piece of chalk. Then, taking any jump consistent with women's basketball rules for jumping (Spalding Rules No. 17R), she marks the highest point on the wall possible. Five trials are allowed, and these trials are recorded in inches to the nearest one-half.

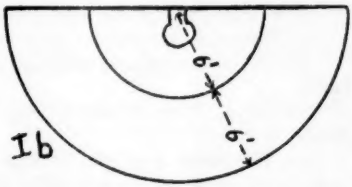
4. *Throw for Goal.*—In the test for throw for goal, two semicircles, one 12 feet and one 6 feet out from the basket, are drawn. An angle 4 feet out from the end line along the 12 foot semicircle is drawn on either side of the basket. Another angle is drawn on the exact center of the 12 foot semicircle so that the base measures 6 feet. Each angle has a letter, as can be seen more clearly in diagram Ia which follows.

In throwing for goal, the player starts in Angle *A*, attempting to make a

basket from that point. From there she continues to Angle *B*, taking one trial from each angle in order, making a total of ten trials in all. Any style shot may be employed. Failure consists in not standing within the required angle, or not making a basket.

The following method of scoring is employed. If the student is successful, a circle is drawn around each letter which appears on the score sheet similar to the angle on the floor from which the girl is shooting.





5. *Pivoting, Bouncing, and Shooting.*—In the test for pivoting, bouncing, and shooting, one semicircle is drawn on the floor or ground 6 feet out from the basket at all points. This is Area II. Another semicircle is drawn on the floor or ground 12 feet out from the basket at all points. This is Area I. Diagram Ib above clarifies this plan.

The individual taking the test stands anywhere outside of Area I, facing the basket with the ball in her hands. At the starting signal, the player pivots (picking up foot opposite to the side from which she pivots), bounces into Area II and shoots for basket, using any type shot. Ten trials are allowed, and all ten trials may be from either the same or different points outside Area I. Failure consists in not starting outside Area I, pivoting incorrectly or not at all, bouncing incorrectly or not at all (Spalding Rules No. 17R), not shooting from Area II, or not making a basket.

A demonstration of this test is strongly advised.

In scoring, on each trial, one point is given for a successful pivot, one point for each bounce, and three for each shot, making a possibility of a total score of five points for each trial. The total score for the ten trials is recorded.

KNOWLEDGE TEST

The theoretical test contains 50 true-false, 15 completion, 20 best answer and 15 pictorial questions, making a total of 100 questions covering rules, team play, strategy, fundamental techniques, and positions of players with their duties. No longer than 45 minutes should be allowed for answering the questions.

HIGH SCHOOL BASKETBALL EXAMINATION

Name ..... Date .....
School ..... City..... State.....

Note: This examination covers questions on three-court basketball with a center toss. The answers to all questions are governed by the Women's Official Basketball Guide (Spalding No. 17R, 1934–35).

True-False Questions.—Read the statement over carefully. Then place a Capital *T* or *F* in the right hand column, after the statement. If there is a question to which you do not know the answer, go on to the next one.

Example: This is a test of your knowledge in basketball. *(Answer)* (T)
1. Forwards always play an offensive game. ( )
2. A foul is a violation of a rule for which a free throw is given. ( )

3. While making a bounce or a juggle, a player may take any number of steps provided the steps are made between the time the ball leaves the hands and the moment it is again touched. ( )

4. A player who starts a juggle and does not touch or regain the ball until it touches the floor is committing an illegal juggle. ( )

5. A bounce may be combined with a juggle. ( )

6. A bounce to be legal must be bounced higher than the knee. ( )

7. A bounce pass may be used after a bounce. ( )

8. If a player has one foot over the boundary line she is out-of-bounds. ( )

9. There are five players on a basketball team. ( )

10. If you are injured while playing you should immediately let your captain know. ( )

11. On a jump, a player may tap the ball before it reaches its highest point. ( )

12. The hand need not remain behind the back when jumping, provided there is no personal contact with opponent. ( )

13. The players should face toward their own baskets when jumping in center. ( )

14. The jumping center may catch the ball after the center toss, provided it has touched the floor first. ( )

15. The jump center may catch the ball after the center toss provided it has touched a side center first. ( )

16. A player tapping the ball before it reaches its highest point is violating the jumping rules. ( )

17. A bounce pass should strike the floor about half-way between you and your team mate. ( )

18. "Time out" may be called three times during a game by the captain. ( )

19. The game of basketball is started with a tip-off. ( )

20. There are five players on a team. ( )

21. Pass to others as you would want them to pass to you is something one should always remember. ( )

22. The ball is in play after each of two free throws. ( )

23. On an out-of-bounds play, the one who knocked it out is allowed to have the throw in. ( )

24. The chest pass is a high pass. ( )

25. The chest pass is a good pass when closely guarded. ( )

26. In order to have the foul of "blocking" called on her, the individual must have personal contact with her opponent. ( )

27. A personal foul against the third player is called if two players have possession of the ball, third player runs in, personal contact results, but third player does not touch ball. ( )

28. "Blocking" is impeding the progress of an opponent who does not have the ball. ( )

29. If there is no personal contact, "blocking" is called a technical foul. ( )

30. Charging is a foul in which a player either with or without the ball makes contact with an opponent with either body or ball. ( )

31. Any interference with a player jumping for a tossed ball shall be construed as "holding." ( )

32. A foul shall be called on a player who puts a hand on the ball and keeps it there after opponent has secured it. ( )

33. It is not a foul for two players on the same team to put their hands on the ball when it is not disputed by an opponent. ( )

34. It is a technical foul to go on the court as a substitute before reporting to the scorer and being officially recognized by an official. ( )

35. In nearly all passes one foot should be ahead of the other. ( )

36. It is a technical foul to consume more than ten seconds in making a free throw. ( )
37. The player's feet may not leave the floor while making a free throw. ( )
38. The ball must be thrown within five seconds on a free throw. ( )
39. If the ball passes through the basket from below and then enters from above, a goal is made. ( )
40. At the start of the juggle the ball should be held in front of the body. ( )
41. A player is permitted to shoot for basket at the termination of a bounce or juggle. ( )
42. In pivoting, the foot should be lifted that is away from the direction one is going. ( )
43. If a ball glances off the face of the backboard and across the boundary line, but before it touches the floor or any obstruction out-of-bounds is caught by a player who has both feet in bounds, it is out-of-bounds. ( )
44. If the ball strikes the edge of the backboard it is in bounds. ( )
45. The ball may be held not more than five seconds out-of-bounds. ( )
46. A ball shall be put in play from out-of-bounds only by a bounce pass or a throw. ( )
47. On a free throw a player will be penalized if she steps into the free throw lane before the ball is thrown. ( )
48. The ball must be thrown within three seconds after gaining possession of it on the court. ( )
11. If a player has fallen down, the pass must be made within three seconds from the time when all of the body weight is again on the feet. ( )
50. In a bounce pass, the ball should strike the floor six inches from the foot of the receiver. ( )

Completion Questions.—Read the question over carefully. Then fill in the blank space with what you think to be the correct answer. Use as few words as possible.

Example: This is a test of your knowledge in *Basketball*

1. An individual being pushed while throwing for basket is awarded ..... if she makes her basket in spite of the foul.
2. The two defensive players on a team are .....
3. The two offensive players on a team are .....
4. The representative of the team is called the .....
5. The definition of a technical foul is .....
6. The definition of a personal foul is .....
7. The ball is dead when:
   A. B.
8. It is a ..... to push opponent who has the ball but is not throwing for basket.
9. If two guards are guarding one player, which should have a technical foul for "boxing up" called on her? .....
10. A substitute going into the game shall first report to the ..... giving .....
11. A goal is made when .....
12. A field goal counts ..... points.
13. Name two ways of throwing for goal.
    A. B.
14. Name three ways of passing the ball.
    A. B. C.
15. A free throw counts ..... points.

Best Answer.—Read the statement over carefully. There is a choice of three answers. Choose the best one, and place the number corresponding to the best answer in the right hand column. All the answers may be correct, but one among them will be better than the other two.

Example: This is a test of your knowledge of: (*a*) *basketball,* (*b*) *baseball,* (*c*) *handball.* Answer: (*a*)

1. The side center, upon receiving the ball from the center toss should throw it to: (*a*) the nearer forward, (*b*) the forward further from the goal, (*c*) the nearer guard. ( )

2. A forward: (*a*) is always an offensive player, (*b*) is never an offensive player, (*c*) is sometimes an offensive player. ( )

3. A double bounce is: (*a*) a personal foul, (*b*) a violation; (*c*) a technical foul. ( )

4. A substitute entering a game: (*a*) may talk to the players before play begins, (*b*) may talk to players before play begins with the umpire's permission, (*c*) may not talk to the players on the floor before play begins. ( )

5. A substitute shall not enter the field of play until: (*a*) after a basket is made, (*b*) at the quarter, (*c*) play has been suspended. ( )

6. A substitute may re-enter a game: (*a*) once, (*b*) twice, (*c*) thrice. ( )

7. A substitute must report to: (*a*) umpire, (*b*) referee, (*c*) captain. ( )

8. A player is disqualified who has committed: (*a*) three, (*b*) four, (*c*) five technical fouls. ( )

9. A player is disqualified who has committed: (*a*) three, (*b*) four, (*c*) five personal fouls. ( )

10. A player is disqualified who has committed: (*a*) one, (*b*) two, (*c*) three disqualifying fouls. ( )

11. A player may leave the court during: (*a*) time out, (*b*) a quarter, (*c*) the half. ( )

12. The only one who may confer with the referee for the team is the: (*a*) umpire, (*b*) jumping center, (*c*) captain. ( )

13. When guarded closely: (*a*) a chest, (*b*) overhead, (*c*) side arm pass is best. ( )

14. A guard should bounce: (*a*) diagonally toward the side lines, (*b*) toward the division lines, (*c*) toward the other guard. ( )

15. When bouncing: (*a*) keep your eye on the ball, (*b*) locate team mate, (*c*) watch opponent. ( )

16. When not in possession of the ball: (*a*) keep your eyes on the ball, (*b*) locate team mate, (*c*) watch opponent. ( )

17. In pivoting, the weight should be kept: (*a*) low, (*b*) medium, (*c*) high. ( )

18. The one who keeps a record of the number of points and fouls made by each team member is known as: (*a*) referee, (*b*) scorer, (*c*) umpire. ( )

19. The game of basketball is played on: (*a*) a court, (*b*) a diamond, (*c*) a field. ( )

20. A pivot is used to (*a*) cover ground, (*b*) outwit defense, (*c*) reach team mate. ( )

(E.N. Part IV of the Knowledge Test consists of fifteen questions in which stickmen pictures and diagrams illustrate a choice of possible plays or positions, from which the correct selection is to be indicated. This section has been omitted because of lack of space. A limited number of mimeographed copies of it are available from the author at a nominal cost.)

BOOK REVIEWS

SCHOOL HEALTH PROBLEMS. Laurence B. Chenoweth, A.B., M.D., and Theodore K. Selkirk, A.B., M.D. (New York: F. S. Crofts & Company, 1937), 387 pages. $3.00.

An introduction to this book gives an interesting history of the school health movement. In discussing "Factors Concerned with Growth," the authors compare old standards of education with modern ones. "Modern education recognizes the need for . . . physical education . . ." Much space is devoted to physical education and its relation to the health and welfare of school children.

In fact, the book will be of interest to all physical education teachers because every page of it has a direct bearing on the subject of most interest to them. The laws of growth are discussed from the viewpoint of the body framework, nutrition, climate, home life, etc.

The value of regular physical examinations and the importance of having those which are made in school followed up by more complete ones by the family physician is very clearly brought out. The teacher is given some helpful hints about winning the cooperation of parents.

The problem of communicable disease control is dealt with in detail. A long chapter is devoted to vision, another to acoustics and hearing. Tuberculosis, mental hygiene, other common handicaps, and "accidents as a problem," are all thoughtfully discussed.

The authors have definitely limited themselves to outstanding and important facts, but have opened the way for exhaustive research work through research of their own. Every page has its footnotes for outside references; every chapter is followed by a lengthy list of "References for Further Study."

The book shows clearly how carefully these doctors have worked to give much information in a small amount of space. Outlines are used whenever possible. Figures, charts, and photographs are numerous. A glossary is provided, and an index supplements the detailed table of contents.

Richard A. Bolt, Dr.P.H., has prepared a chapter on "School Health Administration" in which he presents in summary, "the arguments for and against administration under a Board of Education or a Board of Health."

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THE TEACHING OF ARCHERY. Dave and Cia Craft. (New York: A. S. Barnes & Company, 1936). 96 pages, paper. $1.00.

Archery as a sport is showing a gratifying increase. This text is well calculated to serve as a guide, particularly for beginners, but will be suggestive also to those more expert in the art. There are chapters on tackle—bows, arrows, accessories and range equipment; selection of tackle for different groups and ranges; laying out of ranges, outdoor, indoor, and clout.

The teaching methods are the result of twelve years of experience in the sport, and eight years of teaching both group and individual archery to juniors and adults on private, commercial, camp, and school ranges. The teaching procedure is well-handled through a few specific lessons. The conduct of archery tournaments with various types of rounds is outlined and suggestions are given for the stimulation of interest in the sport and for its advancement.

In most cases a definition or explanation of the technical terms used follows immediately after the first employment of the term. The descriptions are clear though a few typographical errors have been noted. Everything considered, the treatise is to be commended and deserves wide circulation.

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Handbook of Health Education. Ruth E. Grout (Garden City, New York: Doubleday, Doran and Co., Inc. 1936). $1.80.

This contribution to the literature of health education in rural schools is unparalleled for its value and presentation. It will undoubtedly prove one of the most welcomed and widely used texts in school health work. Failure to list it among the best books on health education for 1936 would be an injustice both to the author and to the intelligence of our profession.

The comprehensiveness and practicability of the material and suggestions offered could never be the result of anything but long practical experience in the field. The health studies of Cattaraugus County, New York, schools have been notable. Miss Grout has had the privilege of being exposed to health situations which are probably more widespread in America than the usual type of situation described in health education texts. A typical rural county —and there are so many of them in the United States—offers a locale for the study of health instruction, health service, and a health protection program, and the means for providing the best available service to meet the health needs of the children in such a situation which is seldom available for professional training and experimentation. That is, little money is available in rural districts for the study or improvement of health conditions. Cattaraugus County (and especially its children) has been fortunate in being able to obtain funds for this important work. The whole nation will profit by Miss Grout's description of and recommendations for health education in rural areas. Twenty years ago children in agricultural areas were considered in a more healthy condition than the youngsters in urban cities; it is common knowledge that the reverse is true now. Our school health programs have been primarily instituted in cities of 50,000 or more population. Such communities can afford adequate programs to meet the individual needs of their students. On the other hand, where well thought out procedures for improving and maintaining healthful conditions and healthy children are most needed—in the sparsely settled regions of our land—one finds generally little or nothing being done. This dearth of rural school health education is not the result of lack of interest, but is caused by failure to secure the means for the preparation of a suitable health organization in the schools. Miss Grout's work in Cattaraugus County leads the way and demonstrates convincingly what can be done in rural areas when good teaching and supervision are provided. This fine practical program is worthy of emulation.

Handbook of Health Education is well organized in its presentation, describes clearly every phase of the program, is copiously filled with practical solutions, and contains one of the finest bibliographies in the literature. It should be—no, it will be—the property of every enthusiastic student, teacher, and administrator of health education.

Ross L. Allen, Dr.P.H.

Sports for Recreation and How to Play Them. Compiled by the Staff of the Department of Intramural Sports, University of Michigan. Elmer D. Mitchell, Editor, A. A. James, John Johnstone, Earl N. Riskey, and Randolph W. Webster. (New York: A. S. Barnes and Company, 1936), 467 pages. Illustrated. $2.50.

It is frequently said that this is an age of maladjustment, hypertension, and neurosis; the American mind is "jittery" and unsteady. Many physical educators, psychiatrists, and other

specialists of "healthful living" agree that there is no better stabilizing and recuperative factor than the one of participation in a sport activity which "produces an absorbing interest and complete abandonment tending to utter forgetfulness of self in doing the thing at hand."

If you have never experienced the mental and physical exhilaration which comes from successful sport participation, if you do not "know" the joys that come to those who participate in recreational sports, if you are interested in learning how to lead a full and rich life via a program of recreative sports, then a copy of *Sports for Recreation and How to Play Them* should be within close reach of you. This volume must have a place especially on every physical education teacher's bookshelf. It is a veritable mine of information on ways of meeting the individual needs of pupils, the increasing number of leisure hours, and the decreasing number of work hours of the general public.

The authors planned their book with these definite purposes in mind, namely, "(1) to extend and develop the increasing interest in healthful, wholesome recreations, (2) to assemble in convenient form needed information on the various forms of physical recreation that has previously not been easily available, (3) to treat each sport from the standpoint of the beginner or average player rather than to go into it extensively."

Each of the first twenty-eight chapters of the book is devoted to a brief but lucid description of one of the following recreative sports: archery, badminton, baseball (softball), basketball (intramural), bowling, boxing, canoeing, equitation, fencing, football (touchball), golf, gymnastics, handball, ice hockey (field hockey bibliography), horseshoes, lacrosse, riflery, rowing and sculling, soccer, speedball, squash racquets, swimming and diving, tennis, track and field, volleyball, water polo, winter sports, and wrestling. In their analysis of each activity, the authors usually follow this procedure: Origin and history of the sport, general description of the sport, place in the school program, instructions in fundamentals, the coaching of skills and techniques, how to arouse interest in the game, glossary of terms, rules of the sport, and bibliography. The next chapter, "Additional Activities," describes the games of codeball, dart, indoor baseball, foul throwing, ping-pong, deck tennis and shuffleboard, omitting explanations of techniques. Teachers and students of sports education, "Y" directors, recreation leaders, and others will find "Practical Aids for Conducting Competition" alone worth more than the price of the text. It vividly describes a number of successful working aids that not only facilitate the promotion of an attractive program of recreative sports, but also minimize the cost of desirable equipment.

The concluding two chapters are concerned with the important topics of "Scheduling Procedures," and "Tests of Achievement."

Durable binding, excellent format, clear type, a cogent introduction (by Fielding H. Yost), 180 illustrations, and a complete index "round out" this most valuable *vade mecum*.

M. Donald Adolph
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Brooklyn, New York

New Pathways for Children with Cerebral Palsy. Gladys Gage Rogers and Leah C. Thomas. (New York: The Macmillan Company, 1935), 167 pages, $2.50.

Individuals with cerebral palsy are handicapped in their attempt to live a normal life not only by their physical incoordination and incapacity, but frequently also by the psychological effect of this physical condition in giving them a constant fear of physical activity, discouragement and unwillingness to attempt new activities, and a profound feeling of inferiority. The overwhelming difficulties which they experience in carrying on the usual activities of normal life would be enough to

fatigue and dishearten the strongest person, and the wonder is that so many of them manage to surmount all obstacles and become useful and independent citizens. Many, of course, are so severely handicapped not only physically but mentally that they are unable to do this, but there are few indeed of them who, under wise and careful training, cannot make substantial gains in physical coordination, in speech, in acquaintance with and interest in the world at large, and in general emotional and social adjustment. This is in every case a task consuming years, with improvement coming slowly and almost imperceptibly, and demands endless patience and twenty-four hour attention on the part of the parent or teacher undertaking this training.

Mrs. Rogers and Miss Thomas have had extensive experience in dealing with spastic children, and are now co-directors of Robin Hood's Barn, a summer camp for children with cerebral palsy. They have written a book which is an invaluable guide for parents, teachers, or physiotherapists dealing with this type of case. It will also prove of interest and value to physical education instructors and other teachers who have more occasional contact with the milder cases, and often find it difficult to understand the nature and extent of the handicap involved and the amount of special assistance and consideration they need in the ordinary school. These factors, of course, vary with each individual, but a general knowledge of the condition cannot but be helpful in every case.

Throughout the book, emphasis is placed on giving each child as normal and happy a life as possible, with muscle training given largely through toys, games, rhythmic activities, and daily activities, and the factors of relaxation and social adjustment given first consideration. A number of useful games and toys are described for the use of these children, as well as some projects which they can carry on individually and in small groups. Specially adjusted furniture and equipment can be made, to assist them in maintaining good body mechanics in all their activities. Many valuable and practical suggestions are given for capitalizing on their interests and slowly-developing abilities in order to teach them the emotional and intellectual independence which is perhaps even more necessary for them than physical ability. The responsibility and opportunity of the parents to help in this teaching is well discussed. Dr. R. Nelson Hatt has contributed a helpful chapter on the "Surgical Aspects of Cerebral Palsies."

This is probably the best book on this subject that has ever been written for the intelligent layman. Every member of the physical education profession should read it, if only to gain an insight into the unsuspected complexity of the simplest coordinations demanded for daily living, and into the special difficulties that beset the path of the spastic child.

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PRINCIPLES AND PRACTICES OF RECREATIONAL THERAPY FOR THE MENTALLY ILL. John Eisele Davis, in collaboration with William Rush Dunton, Jr., M.D. Foreword by Dr. Adolph Meyer. (New York: A. S. Barnes and Company, 1936), 204 pages. $3.00.

Here is a pioneer piece of work by a well known physical educator and a leader in the field of mental rehabilitation. This book, the first of its kind in this field, marks another milestone in the advancement of mental therapy and also of physical education as an agent in the treatment of psychiatric disturbances. It is the opening gun of physical education in a new field of endeavor full of big opportunities. The two authors are well qualified by training and experience to undertake an authoritative discussion of recreational therapy.

Their book, however, does not contain nearly as much material as one would suppose from the breadth of the title. It is full of generalizations with

little elucidation to clarify the meanings. In some cases topics are dismissed with quotations from other sources. References are cited at the bottom of the page on which they were used. True, there is a paucity of material in this field but not so bad that only forty-seven references can be cited in a book of this type.

A hurried perusal of the book gives one the impression of easy reading because of the numerous topical headings and generous spacing. Unfortunately no attention has been paid to the problem of terminology and definitions. In a new field particularly, this causes much misunderstanding. Instead of clarifying the situation, this book adds to the difficulties. Physical therapy is used in a sense opposed to the definition of the American Congress of Physical Therapy and the American Medical Association. Active water therapy is introduced to us without explanation. One gathers that the authors mean swimming. Numerous psychiatric terms are used with obscure meanings. The term physical education is not even mentioned, although in my opinion this book deals with nothing but that subject. Physical education is recreational therapy, but recreational therapy is not just physical education.

The purpose of the book is given in the introduction as "an attempt to formulate (the) material (in this field) with detailed information and definite procedures so as to enable the therapist to organize, systematize, and carry on his daily routine."

In this chapter, it is also stated that the "psychotic individual (is) deficient in acceptable social behavior" which agrees with all modern thought on this subject and is the cornerstone of our therapeutic structure. The statement should also include neurotics who are in mental hospitals. General educational principles are also discussed.

Chapter I is titled "Types and Disease Entities." Introverted and extroverted personalities are briefly discussed. The balance of the chapter is devoted to a description of the more common mental diseases with brief remarks on the use of physical education for each type. The comments on the recreational therapy to be used for each type of disease are interesting but of limited value, for no two individuals with the same diagnosis will react identically nor can one use identical methods and activities for them. Examples to prove this point are given in a later chapter.

Chapter II is on "Education and Re-education." Some of the topics covered are methods of teaching, psychological principles, treatment of dementia praecox, instructions to nurses and attendants, educational values in recreation, administrative position of physical director, and active water therapy.

The third chapter is headed "Interest and Effort." Some topics covered besides interest, effort, and motivation are appeal and value of recreation, voluntary participation, classification of interests (from Mason and Mitchell), and characteristics of temperament. Eight pages are devoted to a list of individual reactions to physical activities obtained from a group of suicidal patients with various mental disturbances. Seven pages are similarly devoted to acute (violent) patients.

Chapter IV is a "Classification of Activities" chiefly in outline form. The activities are grouped in several different ways.

Chapter V is on "Tests" of various types, physical and mental.

"Formal and Informal Exercise" are discussed in the next chapter. In addition to these two topics, there are discussions of aims and objectives, reports on patients, resistive type of patient, therapeutic applications of work, and therapeutic values of work.

The final chapter is on "Aims and Objectives." On page 172, the authors say, "The respective aims of recreational therapy for so-called normals and the mentally ill are fundamentally different." Are we not aiming for social adequacy or personality integration in all cases? After this statement, the authors list as general and specific objectives, with minor changes, those reported by the Committee on Objectives

and Policies of the Public School Section of the A.P.E.A. This chapter also gives activity schedules for various types of patients and a course of study for nurses and attendants.

A glossary and index are included in the book.

I congratulate the authors on being the first to add material to this field in book form. It will stimulate discussion of our problems, help point out our relationship to other branches of education, and will direct attention to a field that needs it. However, I cannot say the contribution fills our need on the subject of recreational therapy for the mentally ill.

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NATURE GUIDING ON WHEELS. William G. Vinal and Teachers of Elementary Science, Western Reserve University, School of Education. (Cleveland: School of Education, Western Reserve University, 1936), Mimeographed, $.75.

The-Nature-Guide-School-on-Wheels is the name of a three weeks' bus trip to New York and New England under the auspices of the School of Education of Western Reserve University. Twenty-five teachers of elementary science banded together to study the nature education of the region through which they traveled. Their findings are offered not only as a memento of the excursion but also as a resume of the trends in nature education in the booklet *Nature Guiding on Wheels.*

Seldom if ever is a work of this nature read with the interest and enthusiasm with which it is written. It is perhaps natural then that the reader should find this booklet to be mostly a collection of more or less unrelated facts many of which are neither interesting nor important, except to one who has visited or expects soon to visit the same scenes. Its chief value therefore lies in its use as a pattern for studying the nature offerings of any one community.

Nature education of the early Colonists was found to have been of the utilitarian type. It consisted of their "everyday life and activity." Providing homes and furnishing them, obtaining food and herbs, raising flax for linen and sheep for wool were examples of activities which required them "to see every possibility in nature which they might adapt to their own needs."

The route of the "School-on-Wheels" led through regions rich in Indian lore, history, and the setting and inspiration of much of our American literature. Such Indian names as Canajoharie, Mohawk, and Monadnock were encountered and interpreted. The scenes of Revolutionary battles and struggles between Colonists and Indians were visited as well as many old landmarks. The Mohawk Valley of James Fenimore Cooper's *Leather Stocking Tales,* Schoharie, the locale of Washington Irving's *Legend of Sleepy Hollow, The Great Stone Face* of Hawthorne's story, Salem, Gloucester, Walden Woods and Pond are just a few of the places visited which are well known by all lovers of literature.

In considering the economic importance of nature study, health is considered one of the chief contributions. The value of many birds as insect eaters and scavengers, trees as guardians of our water supply and forests as recreational areas can hardly be estimated. Many medicines are derived from wild or cultivated plants. Other economic values derived from nature study are soil conservation, improvement of certain plants through cross breeding, and meteorological observations and forecasts.

In regard to insects, we find that their 600,000 species outnumber all other animals combined. The losses in the United States caused by insects is placed "conservatively" at $795,000,000. Man is aided in his fight against the harmful species by mammals, birds, reptiles, amphibians and other insects. Among the most destructive, the greatest offenders are probably the Japanese beetle and the gypsy moth. Federal and State Departments of Agriculture furnish information on methods of controlling these and other insect pests.

Propaganda, along with improved devices, techniques, and laws, may yet save our forests, and prevent the extermination of some of our most interesting wild animals. With such catchy slogans as "A tree can make a million matches, a match can destroy a million trees," we are made aware of the consequences of forest fire. Lookout stations, telephones, airplanes, and even radios are brought into use during the season when the woods are dry. Such wild life as deer, bear, beaver, waterfowl and others which faced extinction are now protected by some states all of the year and by most states some of the year.

"Outdoor good manners" are, like any other type of good manners, a matter of consideration for others. Preserving the beauty of the outdoors by not picking the wild flowers nor mutilating trees shows good manners. Obeying regulations automatically in parks, camp sites and on the road is evidence of a sense of courtesy. The best outdoor manners are summarized as "those that tend to conserve nature and that enable man to live in harmony with his fellowmen in the out of doors."

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PARTNERS IN PLAY. Mary J. Breen. (New York: A. S. Barnes and Company, 1936), 185 pages. $1.00.

The great increase in leisure for most people in this country, and the prediction by authorities of even more for all in the future, serves to emphasize the growing problem of what to do, i.e., the worthy use of leisure time. Recreation leaders particularly need help in the clarification of principles of coeducational recreation, and specific suggestions for definite activities which are suitable for boys and girls, or men and women, to "play together." The new book by Mary Breen, *Partners in Play*, fills this need, and is an excellent guide to a solution of the problems.

The book presents a most attractive appearance, from its splendid illustrations inside the covers, throughout its entirety, both appealing to the eye and stimulating to the intellect. In spite of the fact that the print used is smaller than usual, the book is easy to read, and with its many section headings to emphasize important topics, makes quick reference to any pertinent question very simple.

Partners in Play is dedicated to a "happier and richer leisure for both sexes, whatever the age; to making possible a real partnership in play," and the short quotation from the poem "To Youth" by Charles Kingsley, in the frontispiece, sets the tempo and purpose for the entire work. According to the introduction, the book is written "primarily for recreation leaders of young people between the ages of 12 to 30, on playgrounds, in community centers, Y.M. and Y.W.C.A.'s, settlement houses, and churches."

There are fourteen chapters in the book, besides a suggested list of activities for mixed groups. At the close of each chapter is a splendid bibliography which should be most helpful. The first chapter in the book, an excellent one, deals with the "Need for More Organized Play for Mixed Groups," and presents in well-chosen words a most challenging and stimulating discussion of the entire problem of the relationship between the sexes. The remaining chapters are as follows: Some Aspects of Effective Leadership; Administering a Recreation Program for Mixed Groups; Parties and Socials; Hikes and Outings; Swimming and Water Sports; Snow and Ice Sports; Arts and Crafts; Music; Drama; and finally, Discussion Groups and Study Clubs. The book is literally a recreation gem, packed with sound philosophy, splendid ideas, and splendid program suggestions which work. Everyone interested in young people, or for that matter, in their fellow men, should most certainly have access to this book!

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HEALTHY GROWTH. Martha C. Hardy and Carolyn H. Hoefer. (Chicago: The University of Chicago Press, 1936). 360 pages. $3.50.

Rarely does one find a long term study in health education. The field itself can only claim real influence in the schools since the World War. But here in *Healthy Growth* we have the report of a study which started in 1921 in the public schools of Joliet, Illinois, and was based on the investigation into the health, growth, development, accomplishment, habits, and social development of some four hundred children as they progressed from the third grade into the junior high school. Extended observation and study of this nature are much needed to justify the expense to which many school systems have gone in order to produce optimum health of their students. The completion of the work published in *Healthy Growth* was made possible by the support of the Elizabeth McCormick Memorial Fund.

The purpose of this study was twofold: "to map out the general growth patterns of a group of healthy children during the developmental period, and to determine the effect of health condition during infancy and childhood on the rate of development of certain of these growth patterns." In order to fulfill their purpose, the authors carried on the inquiry for twelve years.

The comprehensiveness of the work which preceded the publication of *Healthy Growth* may be demonstrated, for example, by the fact that a minimum of 132 pages of tests, measurements, and ratings, and 90 pages of questionnaire and observational data were collected for each child. The data included pediatric examinations, anthropometric, psychological, sociological, and academic tests, evaluations of health habits and knowledge, yearly accomplishment in physical achievement, behavior and personality schedules, personal activities, parent contact reports, etc.

Some of the gratifying—others, not so gratifying—results reported are:

Marked improvement in health condition usually accompanies the health program as it progresses. The children received better ratings, for example, in posture at the end of the experiment than at its beginning. The average child had fewer types of defects at the close of the program and some improvement within these types had been made. The incidence of dental cavities and of mouth breathing, however, was not decreased during the course of the investigation.

The participants in the health education program, as compared with those children not having the opportunity to participate, showed a higher rate of general anthropometric development, demonstrated little evidence of differences in dentition, but greater muscular strength, were probably somewhat more mature (girls), and, in athletic ability, were superior.

Elementary school children who participated in the health-education program showed the effects of health training in an increased rate of improvement in school subjects. School success, however, judged in terms of school records, was apparently not affected by an efficient program of health education.

The above conclusions are but a few of the results printed in *Healthy Growth*. There is little doubt that this publication will become a standard text in professional training courses for both health and physical education instructors and academic teachers.

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